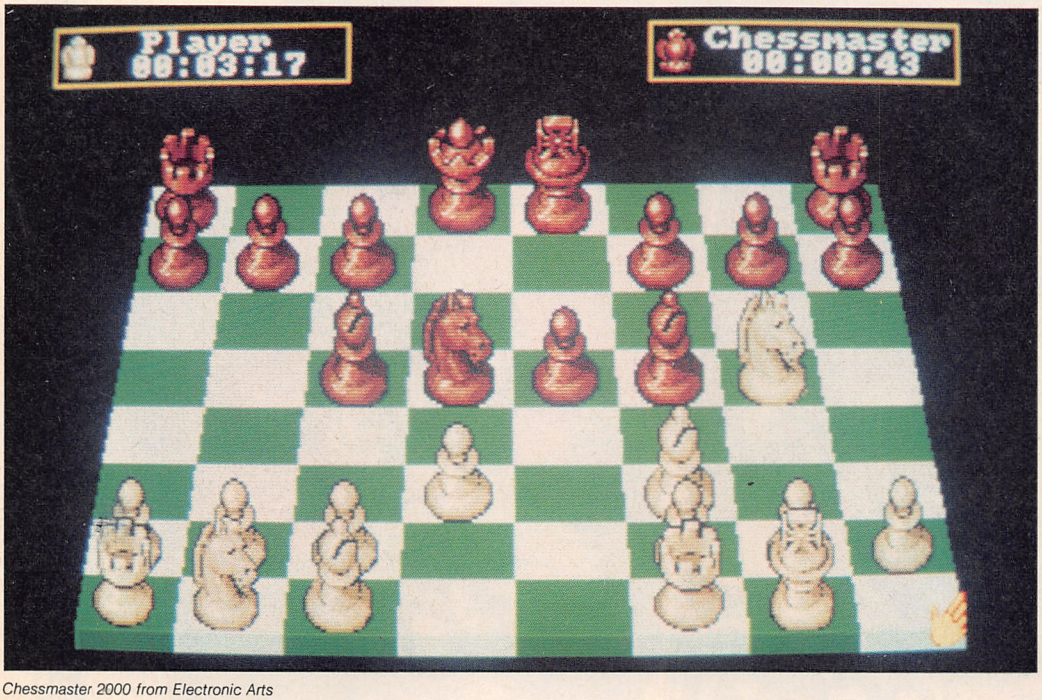
August 28–September 3 1987 Vol 6 No 34 60p

POPULAR Computing WEEKLY



Chessmaster 2000 from Electronic Arts

NEWS DESK

Amstrad's 1512 range: price cuts?

SOFTWARE

Electronic Arts – a name to remember?

FEATURES

Video titling

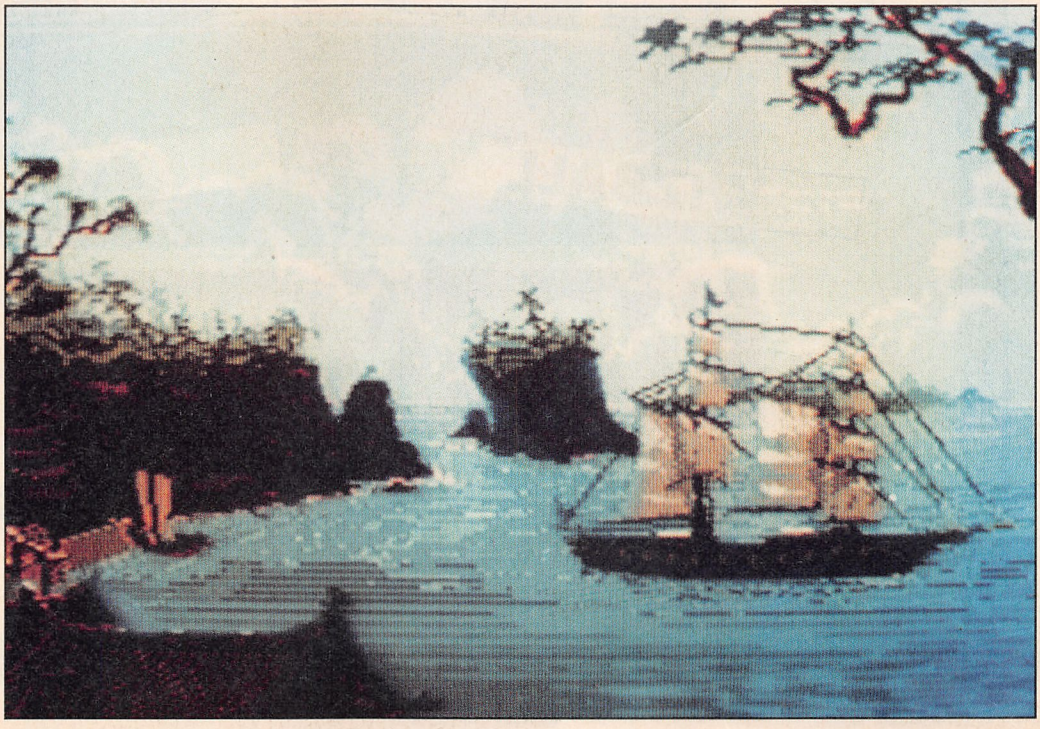
Learning Lisp

Prestel mailboxing

GAMES

Tai-Pan: better late than never?

Tai-Pan on the Atari ST



ATARI COMMODORE SPECTRUM

SPECTRUM AMSTRAD

COMMODORE COMMODORE

AMSTRAD ATARI

ATARI SPECTRUM

N·E·W RELEASES

WIZBALL

Exolon

WOOLWORTHS

A Great Deal in Entertainment

VISA

* At selected larger stores.

* Items subject to availabilty

COMMODORE SPECTRUM AMSTRAD

POPULAR Computing WEEKLY

Aug 28–Sept 3

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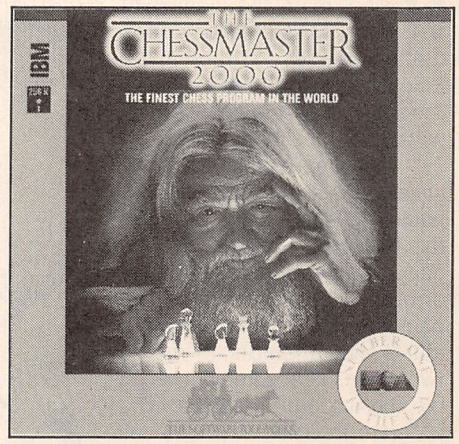

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32 Soundcheck The USA is the place to be for music software at the moment, but Mark Jenkins tells you how to get hold of some of the American packages on import.

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14 Video Title Shop Jazz up your video screens with captions and some simple graphics with this program from Datasoft via US Gold. Chris Jenkins reports.

16 Electronic Arts EA has been renowned in the US for its games which involve a bit of thought and strategic awareness rather than heads-down, no-nonsense, mindless zapping.

Now the company has installed itself in the UK and given us a foretaste of its first releases for the British market. Peter Worlock samples some of the 26 titles on offer.

Programming

18 Learning Lisp In this, the final part of our guide to Lisp, Kenn Garroch takes you, step by step, through some practical applications of the language.

20 Listings Those RSX commands we publish for Amstrad CPCs are all very well, but how do you merge them together to use in one machine code program? Simon T Goodwin provides an answer in his routine this week.

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27 Bytes and Pieces Short routines for you to type in, including a simplification of extra memory access on the Atari 130XE, a 'sprite investigator' on the Commodore 64, and a text facility for the Atari ST.

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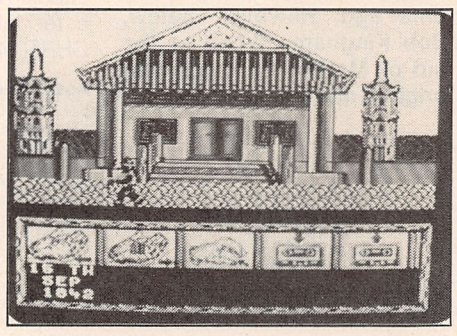

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41 New Releases Your complete guide to all the software released this week, including *Tai-Pan* (remember *Tai-Pan?*) from Ocean, Imagine's warrior-goddess *Athena,* and the latest in a long line of compilations, *Classix,* from The Edge.

Editor Christina Erskine **News editor** John Brissenden **Features editor** Cliff Joseph **Technical editor** Duncan Evans **Marketing and Advertisement manager** David Osen **Advertisement executive** Athena Peerman **Classified manager** Susannah King **Classified executive** Robert Cole **Editorial secretary** Annmarie Allan **Administration** Carol Frith **Credit control manager** Gabriella Piscina **Managing editor** Peter Worlock **Publishing director** Jenny Ireland. **Published by** Sunshine Publications Ltd, 12–13 Little Newport Street, London WC2H 7PP. Tel 01-437 4343 Telex 296275 Fax 01-439 0681 **Typeset by** Magazine Typesetters, 6 Parnell Court, East Portway, Andover, Hampshire. **Printed by** McCorquodale Magazines, Andover, Hampshire. **Distributed by** S M Distribution, London SW9, Tel 01-274 8611, Telex 261643.
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ABC

How to submit articles Articles which are submitted for publication should not be more than 2000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here – so please do not be tempted. We cannot guarantee to return your programs – so please do not send your only copy. **Accuracy** *Popular Computing Weekly* cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

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LETTERS

Oasis – just a mirage

Having read the complaint from Miss Marion Tuck (Letters, August 7), about the function missing from an Oasis program, I felt compelled to write about a similar problem.

I was impressed with the initial view of the original Oasis package *White Lightning* and the range of facilities that the accompanying booklet described. Having bought the package for my Spectrum, I found that attempts to merge two pieces of assembler (saved by the program) caused the program to crash. A phone call to Oasis brought about the discovery that the original programmer had left the company and that they were aware of the omission because they were able to give me a patch to the basic program over the phone.

As I became more proficient I began to experiment with the 'macro' facilities described in the booklet. Apart from a minor success at the simple level, all the efforts at using the more useful aspects of this facility generated error messages.

Another phone call to Oasis was met with apologies and a promise of a free copy of their forthcoming replacement assembler/monitor/disassembler program. Suitably appeased I waited for the package to arrive. It never did and, like Miss Tuck, I was unable to track them down.

Alan J Baker
Bournemouth

Oasis ceased trading some time ago. However, below, Bob Kingham comes to the aid of Marion Tuck with her original query.

Sptgen: the missing link

Regarding Miss Marion Tuck's plea in Letters, August 7, here are lines 50110–50160 of Oasis's *Sptgen* which she lacks:

```
50110 DATA 133,36,230,73,102,36,169,
40,42,73,1,145,34,136,208,244
50120 DATA 165,34,105,40,133,34,144,
2,230,35,198,37,208,222,96,0
50125 DATA 169,53,133,1,32,208,4,169,
55,133,1,96
50130 LABELchr2hires (x,y):DOKE 73,
$e000+x*8+y *320:SYS $04a0:
PROCEND
50140 LABELhires2chr (x,y):DOKE 73,
$dff8+x*8+y *320:SYS $0500
50141 IF aflag%=1 THEN PROCupp
50142 PROCEND
50150 DATA 169,204,133,76,169,
41,133,75,169,8,133,77,160,0,177,75,
74,74,74,74
50160 DATA 162,3,221,248,5,240,3,
202,208,248,138,6,78,6,78,5,78,133,
78,200,200
```

I hope I have been of help.

Bob Kingham
London E17

Patching up Micromon

Re Micromon, by P A Fairclough, *Popular Computing*, 15–21 May: unfortunately there are three bugs in this excellent program. Luckily two of them are easy to fix.

If you list a line in printable Ascii by using 'l' and press Return, some bytes may be changed unintentionally. The reason is that Commodore Ascii codes are not defined definitely.

If you print the Ascii-code of Shift A, you get 193 and C=A (Commodore A) returns 176. The other way round, you get capital A and the graphic character also by CHR$(97) or CHR$(240), respectively.

Assemble: old routine

```
50634   C5CA 20 8C C1 JSR $C18C
50637   C5CD 90 09    BCC $C5D8
50639   C5CF 98       TYA
50640   C5D0 D0 E3    BNE $C5B5
50642   C5D2 A6 24    LDX $24
50644   C5D4 30 DF    BMI $C5B5
50646   C5D6 10 07    BPL $C5DF
50648   C5D8 C8       INY
50649   C5D9 D0 DA    BNE $C5B5
50651   C5DB A6 24    LDX $24
50653   C5DD 10 D6    BPL $C5B5
50655   C5DF CA       DEX
50656   C5E0 CA       DEX
50657   C5E1 8A       TXA
50658   C5E2 A4 20    LDY $20
```

Assemble: new routine

```
50634   C5CA 20 8C C1 JSR $C18C
50637   C5CD 90 01    BCC $C5D0
50639   C5CF 88       DEY
50640   C5D0 C8       INY
50641   C5D1 D0 E2    BNE $C5B5
50643   C5D3 A6 24    LDX $24
50645   C5D5 D0 01    BNE $C5D8
50647   C5D7 18       CLC
50648   C5D8 CA       DEX
50649   C5D9 CA       DEX
50650   C5DA B0 03    BCS $C5DF
50652   C5DC 10 D7    BPL $C5B5
50654   C5DE 2C       BIT
50655   C5DF 30 D4    BMI $C5B5
50657   C5E1 8A       TXA
50658   C5E2 A4 20    LDY $20
```

Let's test it: Just enter M CFFO CFFF, then type I CFFO and finally again M CFFO CFFF. If you compare the hex-bytes of the two memory commands, you'll notice that some of them have changed their values. Now it's no longer possible, to display the register by pressing R. You only can avoid this by using Shift Return to leave Interpret-mode.

In case you want to overtype old text or enter a new one, make sure, that there are no program-bytes in this line. Otherwise you should enter the characters by 'address "aaaa . . .

The other two bugs will be corrected by the enclosed patch. Firstly, the line-assembler doesn't allow all branches from −128 to +127. Instead it works only from −126 to +125.

Patch

```
10 ML=50637:REM ASSEMBLE
20 FORI=MLTOML+19
30 READA:POKEI,A:S=S+A:NEXT
40 IFS<>2468THENPRINT"FEHLER":END
50 ML=52774:S=0:REM LOAD
60 FORI=MLTOML+4
70 READA:POKEI,A:S=S+A:NEXT
80 IFS<>1080THENPRINT"FEHLER":END
90 DATA144,1,136,200,208,226,166,36,
 208,1,24,202,202,176,3,16,215,
 44,48,212
100 DATA234,234,234,234,144

READY.
```

Secondly, loading a file will always display a quotation mark even if no fault occurred. The program doesn't only check for the carry cleared, but also expects the STatus (144) to be zero. But it always contains #64 after loading a file.

Load: old routine

```
52769   CE21 20 D5 FF JSR $FFD5
52772   CE24 B0 CC    BCS $CDF2
52774   CE26 A5 90    LDA $90
52776   CE28 D0 C8    BNE $CDF2
52778   CE2A F0 2C    BEQ $CE58
52780   CE2C 20 70 C8 JSR $C870
```

Load: new routine

```
52769   CE21 20 D5 FF JSR $FFD5
52772   CE24 B0 CC    BCS $CDF2
52774   CE26 EA       NOP
52775   CE27 EA       NOP
52776   CE28 EA       NOP
52777   CE29 EA       NOP
52778   CE2A 90 2C    BCC $CE58
52780   CE2C 20 70 C8 JSR $C870
```

By the way, Micromon allows you to load programs to any wanted address by adding this at the end. Just type 'L"name", 08,address. This gives you the possibility of loading two versions of a program to different memory locations, if you want to compare them.

Franz Paulsen
Kiel, W Germany

The ups and downs at Compunet

I feel I must write to you in the interests of accuracy following a misleading article in your magazine.

The article, in *Popular*, July 24, was entitled "Compunet prices go down" and did not report the true effects of Compunet's new pricing policy.

Up until the end of June this year subscribers could access Compunet in two possible ways, either through one of twelve national nodes owned by ADP or through the ISTEL network.

Access via the ADP nodes was free to the user and 80% of subscribers using the service accessed in this way.

Initially, ISTEL access was an additional 60p per hour but this was increased some time ago to 90p per hour, this worked out fractionally cheaper than long distance telephone calls for those not within local range of a free node and was used by up to 20% of subscribers.

The new Compunet hardware and the closing of the ADP nodes mean that all users must now access through ISTEL.

This means an immediate increase in costs for the vast majority of users even though the ISTEL connect charge has been put back to its original 60p per hour.

The only people that will have their charges reduced are the small minority of users who already accessed via ISTEL.

Even the best possible deal for standard subscribers will involve an increase in subs to a Gold subscription followed by a further payment of £3.45 per quarter to cover any connect time, that can hardly be called a drop in prices!

Having said that, I am one of the tiny percentage who already used ISTEL and am already a Gold subscriber so I should find lighter bills. However we are a very small minority.

W M Barry
Bolton
Compunet ID: CATZ

Software for the Sord

With reference to the letter from Steven Folkes, in the July 31 issue, regarding more information about the Sord M5.

If you're after software, try Playfair Projects, 133 Hookfield, Harlow, Essex, CM18 6DL.

Also I've put together a mini NL free to any Sord users; if interested please write to Ross Carter, 16 Mayfield Road, North End, Portsmouth, Hants, 0703 696543. A few stamps to cover costs would be appreciated.

Ross Carter
Portsmouth

BOD adventure shock horror

I am writing to point out a mistake you made in the August 14 editon of *Popular*. You state in your New Releases column that *Book of the Dead*, a new Spectrum game available from CRL is an arcade game.

As a co-author of *BOD* I hope I can say, without fear of contradiction, that it is a graphic adventure and not an arcade game as stated.

I hope that you do not feel that I am being pedantic with this correction. With a shortage of good adventures available on the Spectrum (compared with arcade games) I feel that adventurers should know when a new game of this type becomes available. Commodore and Amstrad adventurers might like to know that *BOD* will soon be available on both tape and disc.

Lee Hodgson
Tewkesbury, Glos

Geordie micro users wanted

I was wondering if any readers who own a Commodore 64 know of a computer club in Newcastle. I've tried various sources but with no success.

If anyone can help, could they phone me on 091-286 3603?

Steven Heley
Newcastle upon Tyne

Bitching and backbiting

There has been a great deal of bitching and backbiting over the old, old subject of whose computer is the best and, for what it's worth, I would like to have my say.

I personally could care little about the differences between the various brands of computer, each have their good and bad points.

However, after having being harangued recently by the owner of one brand of machine, I decided to give machine popularity the acid test. This consisted of picking two non machine specific magazines at random (*C&VG* and yourselves) then covering three major points denoting popularity of machines; a) advertisements for software, b) reviews/news of new titles and c) suppliers' adverts.

The resulting figures (in percentages) for support of the top eight computers are as follows:

Commodore C64/128	58%
Spectrum 48/128	46%
Amstrad 464/664/6128	40%
Atari ST (all models)	34%
Commodore Amiga	17%
Atari (8 bit)	10%
BBC (inc Compact)	7%
Electron	4%

As a final note, I did a quick survey of the range of magazines available for the above computers and found that, once again, there were no surprises with the ratio of magazines reflecting their popularity.

Despite being only a quick spot survey, and we all know what they say about statistics, it does go to show that despite certain users' protestations, the level of support for home machines is as one would expect.

P Davis
Hull

Information comes forth

In reply to your request for information on Forth user groups, the obvious person to contact is the membership secretary of FIG UK: Colin Walls, 88 Woosehill Lane, Wokingham, Berks RG11 2TS.

In addition, readers in the Oxford area may be interested in an evening course on Forth programming. This takes place between 7.00–9.00pm on Thursdays.

Further details can be obtained from Judith Kennedy, Community Education Organiser, The Ferry Community Centre, Summerton, Oxford OX2 7PD (0865 52295).

Francis Glaisborough
Oxford

Screen test for the QL

Recently a correspondent owning a QL asked how it was possible for the computer to react when an on-screen barrier was reached.

I'm sorry I can't specify which issue, but if no other reply has been received, could I suggest that *Illustrating Superbasic on the QL*, by Donald Alcock, published by Cambridge University Press, provides one answer.

On pages 161 and 162 he gives listings for a function and a procedure. The function PEER will return a number indicating the colour of a specified pixel; the procedure PORE will place a pixel of specified colour at indicated coordinates.

R A Hewett
Chelmsford

Silence on the racetrack

I'm writing in the hope that you can advise me on a computer game I bought a few months ago.

It's *Sport of Kings* by Mastertronic, and in the instructions it says that you can get speech if you use it with a Currah speech unit. I've being trying to do this, but it just won't work.

C W Hawkins
Bicester, Oxon

Mastertronic tells us that a speech option was planned for inclusion with *Sport of Kings*, but in the end was omitted. A few copies went out mentioning the speech feature on the inlay card, but this was removed in later runs of the game.

Hanging on the telephone

Either in late 1986 or early 1987, you published a series titled Beginners' Guide to Computing. Included was a listing for a 'phone book'. Is it still possible to obtain a copy of this listing?

Also, could someone tell me where I can obtain a copy of *Melbourne Draw*? I have found it impossible to get one from Spectrum dealers.

Les Rees
London N1

The phone book listing appeared in the issue dated January 29–February 4, 1987. To get a copy, contact Carol Frith in our back numbers department, at 12–13 Little Newport Street, London WC2H 7PP. Back issues cost 75p, inclusive of p and p.

Try getting in touch with Mastertronic for *Melbourne Draw*, at 8–10 Paul Street, London EC1, 01–377 6880.

Threat to the pawn

In Game Two of our readers' versus *Colossus* chess tournament, the readers, playing white, have continued their attack with the queen on black's knight side pawn. *Colossus* has defended by moving its pawn to h6.

Over to you

How would you continue the readers'attack?

Send your suggested move to either Inter-Mediates (*Popular* Chess), Freepost, Sawbridgeworth, Herts CM21 9YA (no stamp needed) *or Popular* Chess, Unit 2, The Maltings, Sawbridgeworth, Herts CM21 0PG (with a stamp).

Only one vote per person please, and all entries must reach either address by Wednesday, September 2.

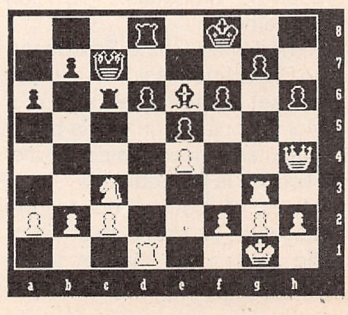
The move which gets the most votes will be entered into the game. Results and *Colossus's* response will be published in two weeks time.

Next week we return to Game One, where the readers are playing back.

Game Two

The moves so far:

1	Pc2–c4	PC7–c5
2	Ng1–13	Nb8–c6
3	Pd2–d4	Pc5xd4
4	Nf3xd4	Pe7–e5
5	Nd4–b5	Pa7 a6
6	Nb5 d6	Bf8xd6
7	Od1xd6	Od8-l8
8	Qd6–d1	Ng8–e7
9	Nbf–c3	Pd7 d6
10	Bc1–e3	KeB–g8 o-o
11	Bf1-e2	Bc8–d7
12	Ke1-gf o-o	Bf8-C8
13	Od1–d2	Nc6–d4
14	Hal df	Nd4xe2+
15	Nc3–e2	Rc8–c6
16	Be3–g5	Qf6–e6
17	Bg5xe7	Qe6xe7
18	Ne2–c3	Bd7–e6
19	Rft–ef	Qe7–c7
20	Ref–e3	Rf8–c8
21	Re3–d3	Rc8–d8
22	Rd3–g3	Kg8–f8
23	Qd2–g5	Pf7–f6
24	Qg5–h4	Ph7–h6
25	?	



Grey imports leave A500 buyers in cold

THE plot thickened in the bootleg Amiga affair last week, as it emerged that the machines on sale in some UK dealers are not 'fake' as such at all, but unofficial, or "grey" imports from the Brunswick plant in West Germany.

It appears that European dealers or distributors may have offloaded stocks at a large discount into the UK to get rid of unsold machines.

Observers suggest that this may be evidence that European Commodore dealers may be having trouble selling A500 Amigas.

Whatever the reason, it's the customer who's at risk. Commodore UK managing director Steve Franklin last week urged customers to be very careful before buying any Commodore product which might not be a UK model.

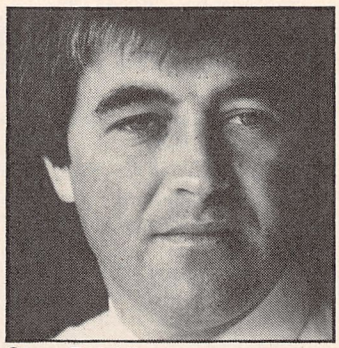
"In any manufacturing, you can never always stop a grey import," he said.

"If they go to a reputable Commodore dealer and are given a special offer, the one question they should ask is: is it a UK model? Commodore UK will not honour any warranty on any machine from abroad that is not the same," he said.

One customer, who had bought a "grey" A500 from Gultronics in London's Tottenham Court Road, called News Desk.

"At first I had problems with *KickStart,* so I went into the shop and got a new *KickStart.* But the Amiga crashes easily and runs out of memory incredibly quickly," said the customer.

Gultronics has notified its branches of the grey imports and has instructed them not to take any similar machines if they are offered them, following advice from Commodore.



Steve Franklin

Gultronics' customer liaison manager, a Mr Parkinson, last week insisted that any customers who had bought a grey machine could have it replaced, or if it was malfunctioning, they could have it repaired.

"We would implement a replacement if it was called for, and if our engineer can see that it wasn't deliberately damaged," he said.

● A Commodore UK spokesman last week revealed that the company is planning a sponsorship bid for this year's Full Members' Cup. Discussions were due to be carried out in Copenhagen this week, and an announcement is expected shortly.

The Full Members' Cup is a competition for clubs from the English First and Second Divisions, which was organised to provide competition for English teams banned from European competition in the wake of the Heysel stadium disaster two years ago.

The move follows speculation earlier this month that Commodore UK was in the running to sponsor the Football League, although that deal eventually went to Barclays Bank.

Ruling on TVs used as monitors

THE Home Office last week clarified the legal position concerning the use of TV sets as computer monitors.

The matter has caused difficulties for a number of people prosecuted for not having a licence for such sets, even though the defendants claimed that sets were not used for receiving broadcast television programmes.

The Home Office Broadcasting Department said: "If a television set is used solely as a monitor in conjunction with a home computer or video game machine, a licence is not required."

It is of course up to the individual to prove that he or she never uses the set to receive broadcast programmes.

WHS software boost for Atari 520STFM

WH SMITH last week announced that it will be giving more than £200 worth of free software with every Atari 520STFM purchased. This follows Atari's recent announcement of a £100 price cut on the machine.

The promotion starts on September 1, and includes hit titles such as *Arkanoid.*

"We think that the Atari 520STFM is one of the most advanced computers in the home market which optimises the use of sound and graphics," said WHS computer buyer Ian Laurie.

"This excellent software package shows just what the computer is capable of and at no extra cost to the customer."

Gooch's cricket has all-star cast

AUDIOGENIC has released *Graham Gooch's All Star Cricket* for the C64.

The game follows on from the original *Graham Gooch Cricket,* and features a World and All-Time XI, as well as players and averages for England, Australia, West Indies, Pakistan, India, Sri Lanka and New Zealand.

Features include dropped catches, wides, bouncers and full tosses, as well as action replays after the fall of a wicket and a practice mode.

GGASC on the C64 costs £9.95 (tape), £11.95 (disc). Further information from Audiogenic, Winchester House, Canning Road, Wealdstone, Harrow, Middlesex HA3 7SJ, telephone 01-861 1166.

Dixons' PC1512 cut fuels rumours of official reduction

THIS summer's spate of speculation about price cuts last week moved on to the Amstrad PC1512.

Many dealers were up in arms at the news that Dixons has chopped £200 off its machines, and this fuelled rumours of an official Amstrad price cut next month.

Dixons' move could well precede cuts by other dealers needing to compete and a price reduction, nearer Christmas, from Amstrad itself can be expected.

The company is, however, remaining non-committal on the subject.

"If and when any price changes are to be made to any of our products, we will make a public announcement," said an Amstrad spokesman.

But the recent launch of the PC1640, and evidence suggesting that the PC1512 market has reached a plateau following the launch, means that some kind of price change is more than likely.

The PC1460: has its recent launch created doubts about the pricing policy on the PC1512 series?

The Dixons cut on the 20Mb machine with colour monitor and one-year service contract brings it down to £1175 inclusive.

The chain is able to make the reduction thanks to its direct import link with the South Korean manufacturing plant, and has therefore angered other dealers unable to compete.

Eidersoft's sound of music

EIDERSOFT will be launching a number of additions to its *Pro* range of ST peripherals at next month's *PCW* Show.

The first is *Pro-Light,* which takes sampled sound from the Midi interface to feed light effects to the screen. *Pro-Drum* is naturally enough a drum machine, while *Pro-Midi* is a software program to take sound from the Pro-Sound sampler.

All three are available separately for £16.95 inclusive, and the *Pro-Midi* package will also be bundled with *Pro-Sound* and a dumb Midi keyboard for about £100.

SOFTWARE HOTLINES

Well, how about the software industry's answer to the Peter Wright scandal?

According to **Microprose,** its next release is a simulation of a Stealth jet fighter, a new jet being developed by the US Air Force which is so secret that the USAF won't even acknowledge its existence.

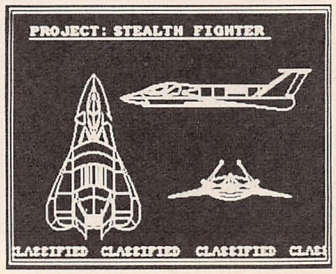
Naturally Microprose is being rather coy about its source of information, but if you want to play around with the latest in top secret hi-tech then *Project: Stealth Fighter* will be released, initially for the C64, in just a couple of weeks.

You'll have to be careful with it though, and not let any nasty pinkos get their hands on it – after all, you wouldn't want to be responsible for the fall of the free world, would you?

Actually, hype aside, I have to give Microprose their due. A number of American outfits have announced new European operations lately in a blaze of publicity and an avalanche of vol au vonts, then taken their time with the goods themselves. But at least Microprose seems capable of meeting its release dates, which means that any minute now we should have a finished copy of its *Moebius* game.

This is an animated role-playing game which combines martial arts combat, spell-casting, and a bit of interaction with the townsfolk of the island of Khantun.

And next month should see a change of direction with the release of *Airborne Ranger.* In it, you play a paratrooper fighting your way to freedom after being dropped behind enemy lines.



The plans of the top-secret Stealth fighter. Who says we're not controversial?

Most of Prose's releases are complex aircraft simulation, but though it's desperately trying to avoid using the word this is really a *Commando* style arcade game.

Dig out the mac and trilby, and you can play the part of Steve Keen, "private spy", in Accolade's *Comics.* This is a complex interactive comic strip adventure, in which you play the hero attempting to unravel a series of complicated plots.

The game unfolds on screen like a conventional comic strip, except that you type in Steve's dialogue yourself, from a choice of three on-screen captions, and the ensuing action depends on your interaction with the characters you'll meet.

There have been similar things done in the past that didn't work too well, because of the simplistic approach caused by memory restrictions but this game is crammed on to three Commodore 64 discs, so it should be a bit more sophisticated than earlier attempts. At first glance, it certainly looks attractive. We'll report on the nitty-gritty of the gameplay next week.

Cliff Joseph

***Airborne Ranger,* Microprose's first arcade game.**

NEXT WEEK

Sound effects

Next week sees the start of a new programming series, this time on creating sound effects on your computer.

While we won't be telling you how to compose your own symphonies, the articles will be explaining some handy ways to use your micro's sound chip in your own programs.

Communications – from the beginning

If you've been interested in getting going with a modem and dialling up bulletin boards and databases, taking advantage of electronic mail and telex facilities . . . but keep getting bogged down with terms like 'parity', 'Hayes standard' and 'baud rate', you can extricate yourself.

Steve Gold explains communications and networking for the beginner: what equipment you want, the jargon you need to understand, and the comms facilities you can access.

24-pin printers

A printer is probably the most sought-after peripheral for most micro owners, with 9-pin dot-matrix models being the most accessible in terms of price and compatibility.

However, if you've been thinking of upgrading your printer, to give your documents higher resolution and a more professional appearance without sacrificing speed or features, take a look at this selection of 24-pin dot matrix models.

3D graphics

Francis Botto explains the principles behind creating 3D images to use in your programs, with examples for you to use.

Sparklers and Pirate arise from CSD ashes

THERE were two new developments last week arising from the ashes of major software distribution house CSD, which went into receivership last month.

First, Maynard International, which recently launched its Top Ten label, has bought the rights to the Sparklers range of games software.

In a separate move, former Creative Sparks man Leigh Richards has announced his own new budget label, Pirate Software. The first Pirate titles are due on September 30.

Since the CSD crash receiver Robson Rhodes has begun disposing of stock, and some observers suggested that CSD might be sold as a going concern, with a number of parties openly declaring an interest.

The Sparklers deal was signed last Friday (August 21), and Nigel Ruddock of Robson Rhodes also revealed that a sale of stock and assets will be held early in September, although some stock is subject to a surplus claim by CSD creditors.

Pirate Software will be releasing its four debut titles on September 30. The range will fall into two streams. Pirate Gold will cost £2.99, and Pirate Silver £1.99.

The four titles are as follows: *Trivial Fruit* (C64), *Holiday in Sumeiria* (Spectrum) are the two Pirate Gold items, while the Pirate Silver ones are *Call Me Psycho* and *Super Smashout* (both Spectrum).

Richards' official capacity will be Publishing Manager, although Pirate is described by the company as "masterminded" by him.

New faces at Virgin

VIRGIN Software, the business division of Virgin Games, has announced its first title, to be exhibited at next month's *PCW* Show, and has also appointed two people to head the new operation.

Collector's Catalogue is a package for indexing, classifying, valuing and producing reports of collections, be it butterflies, records or stamps.

Five other titles are under development, and all six are expected to be on view at next month's show.

Maya Patel has been installed as Virgin Software's Product Development Executive, and

Maya Patel

Paul Latham, formerly manager of Virgin Games, has been appointed general manager for the label. He said: "It is for those people who have suddenly found a PC compatible within their price range but don't know what to do with it other than using it for financial modelling or word processing."

MORE NEWS ON P10

CAD pack for C64

SUPERSOFT has added to its range of C128 peripherals with a low-cost computer-aided design (CAD) package, called *CAD128,* appropriately enough.

It is designed to be used for designing small printed circuit boards, and can output to any Epson-compatible dot-matrix printer, or Hewlett-Packard-compatible laser printer.

CAD128 costs £49.95 on disc only, and is available from Supersoft, Winchester House, Canning Road, Wealdstone, Harrow, Middlesex HA3 7SJ, telephone 01-861 1166.

The Edge gets new sister label

A NEW arcade games label is on its way from Softek, and will be a sister label to The Edge. Ace will receive its official launch at the *PCW* Show, although initial titles are expected from the end of August.

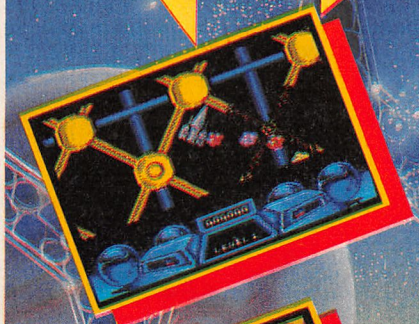
"We felt that The Edge's image as a producer of 'games that make you think' such as *Fairlight* was being confused by our entry into the arcade style market with *Shao Lin's Road* and *Shadow Skimmer,*" said Softek's managing director Tim Langdell.

"Now The Edge will focus on non-arcade games which primarily aim to be state of the art and innovative entertainment software for both 8-bit and 16-bit micros."

The first Ace titles will be coin-op licenses – *Alien Syndrome, Soldier of Light* and *Darius.* These will be followed later in the autumn by *Xecutor, Tangent* and *Shockwave.*

Meanwhile forthcoming Edge releases include *Inside Outing,* conversions of *Fairlight II* and *Warlock, Mindstone* and *RISK.*

IMPLOSION



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Organiser: Pulser Software (0706) 849189

23–27 September
Personal Computer World Show
Olympia, London
Details: Latest hardware, software and peripherals for business and leisure computing
Price: £3, £2 – (parties over 10)
Organiser: Montbuild 01-486 1951

OCTOBER

15–17 October
Desktop Publishing Show
Business Design Centre, London
Details: Demonstrations of latest hardware and peripherals, plus seminars and user clinics
Organiser: Database Exhibitions, 061-456 8383

NOVEMBER

14 November
National Einstein Exhibition
National Motorcycle Museum, Birmingham
Details: Einstein software etc.
Price: 50p
Organiser: UKEUG (0473) 49507

Prices, dates and venues of shows can vary, and you are therefore strongly advised to check with the show organiser before attending. We cannot accept responsibility for any alterations to show arrangements.

Commodore gets a lift from 1987 figures

COMMODORE International last week posted encouraging figures for the last quarter of fiscal 1987, turning a 1986 loss of $127.9 million (about £79 million) into a net profit of $28.6 million (about £17.6 million).

The turnaround was achieved on lower turnover, down from $889.3 million (about £549.2 million) to $806.7 million (about £498.2 million).

Quarterly figures were equally impressive, with fourth quarter profits at $2.1 million nearly double the $1.2 million figure for the corresponding period in 1986. Again, this was achieved on lower turnover, down from $208.6 million (about £128.8 million) in 1986 to $190.4 million (about £117.6 million) this year.

"The fourth quarter of fiscal 1987 marks Commodore's fifth successive quarter of profitability," commented Gould last week. "We achieved this profitability through operating efficiencies implemented without sacrifice to aggressive new product development and marketing."

Prism announces budget double

TWO labels affiliated to Prism Leisure Corporation – Addictive and Endurance – have announced a clutch of new titles for release on September 1.

Addictive has announced the forthcoming release of the budget version of *Head Coach*, which aims to be "to American Football what *Football Manager* continues to be for soccer fans".

As such, it is fairly similar to *FM*, featuring the picking of a team to fight through the 12-week season to the Superbowl.

Head Coach will now cost £2.99 for the 48K Spectrum and C64, and £6.99 on Commodore disc.

Meanwhile Endurance has announced the budget re-release of its 1985 title *International Karate*. Budget prices are as follows: £2.99 48K Spectrum, C64, C16, Amstrad CPC and MSX, and £6.99 on Commodore and Amstrad disc.

Rescue service for damaged discs

S&S ENTERPRISES has announced the start of its Disk Doctor Service, for rescuing important but inaccessible data.

S&S says that the service will tackle anything, from deleted files and corrupted databases to formatted hard discs and discs that DOS won't recognise.

The snag is that if the service is successful in freeing the data, the charge can be several hundred pounds. But the service is operated on a strict basis of no fix – no fee. S&S claims that it has a 90 per cent success rate, on discs that others have given up on.

Contact S&S Enterprises, 31 Holloway Lane, Amersham, Bucks HP6 6DJ, telephone (02403) 4201/28095.

MORE NEWS ON PAGE 13

New printers from Brother

BROTHER has announced a range of new printers which it will be displaying at November's Compec exhibition.

The 2518 – an 18-pin dot matrix printer – can accept any type of stationery, from envelopes to thick card and sticky labels. It has a draft speed of 360 cps (characters per second), and a near-letter quality speed of 75 cps. The 2518 has 12K memory and a seven-colour facility.

Brother will also be displaying the 1724, a 24-pin letter quality dmp. This operates at 216 cps in draft mode, or 72 cps letter quality. The 1724 is compatible with the Epson LQ-1000, Diablo 630 and IBM ProPrinter XL.

Finally, there will be the new HL-8 laser printer, which prints eight pages per minute and has five resident fonts with a further two font cartridge slots.

Further information from: Brother Computer Peripheral Division, Jones & Brother, Shepley Street, Guide Bridge, Audenshaw, Manchester M34 5JD, telephone (061) 330 6531.

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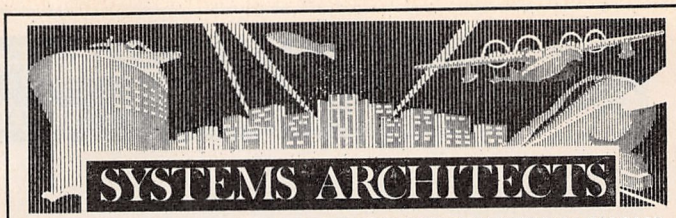

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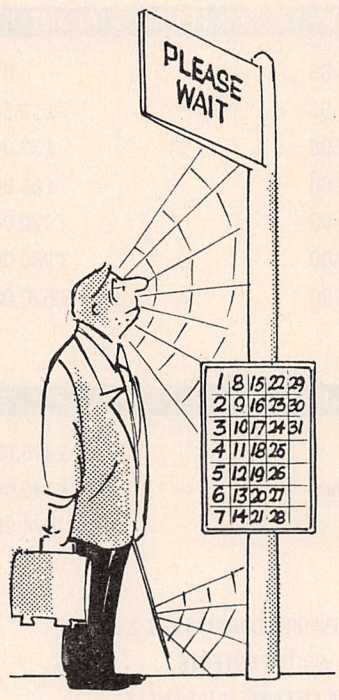

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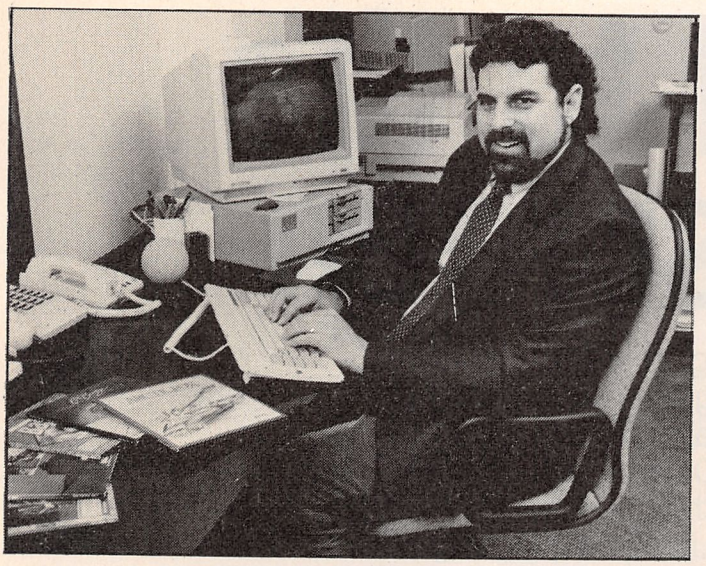


Mark Lewis, director of European publishing

Electronic Arts – by special delivery

John Brissenden visited Electronic Arts' new European headquarters to hear about the US company's plans for the UK.

THE name Electronic Arts has been cropping up with increasing frequency over the past few months, and the autumn looks set to see the company adopting a much higher profile.

It's certainly not the first time that an American software house has set up here, and has made big bland claims about company philosophy, giving more to the consumer, making computing fun, and so on *ad nauseam*. The bad news is that Electronic Arts is making all those claims as well.

However, there are a number of things about the UK set-up that do make it different.

The most striking thing about the company's new Jeffrey Archer-clean headquarters in Langley, Berkshire, is its size. With 10,000 square feet of warehousing, as well as vast office space set up before next month's official launch, clearly this is a firm with deep pockets.

"We'll have invested £1 million here by the end of December, and we'll be employing 50 people at Langley alone," says John Forrest, director of European distribution.

Electronic Arts claims to be more successful in the US than both its nearest rivals combined, and anticipates 1987 turnover in the United States upwards of $50 million.

A key element in EA's corporate strategy, and the one which marks the company out from competitors, is its direct distribution methods. Instead of having the product handled by a third party in getting it to retail outlets, EA has a direct sales team.

A company document claims: "The distribution leader gets more attention from key retail customers. He [sic] gets first shot at special promotional opportunities.

"He has more power to get shelf position for unproven new titles. In addition, with better information from a broader portfolio of sales results, he can design better marketing programs, and can spot product trends more quickly".

The direct sales approach has certainly contributed to EA's success in the USA market. But observers will be watching the first few months of the UK operation with interest.

Not only is the company a relatively unknown quantity, but the direct sales method is going to be up against the combined might of the major distributors. Other companies have tried the direct distribution approach and admitted defeat.

So, while EAUK has access to HMV, WH Smith, Laskys, Tandy and Menzies among the major multiples, as well as CTNs, the battle will be largely won or lost on the attempt to get EA product into Woolworth's (hopeful) and Boots (very doubtful).

"Several retailers have said that they cannot take our products at this stage. That's not suggesting that they will or they won't. We will continue and try to show products progressively," says Forrest.

"But we're going to see more people with a greater acceptance of the way we're selling direct to retailers," he adds.

It's not all uphill. The company's main point of interest to the games player is its head start over most UK houses in 16-bit software. The 16-bit market is already established in the US, and PCs and Amigas are already among the most common home micros.

Over here the 16-bit market is just finding its feet. As the ST and Amiga establish themselves, EA will have the lead over UK outfits such as Hewson, which are only now involved in 16-bit software development.

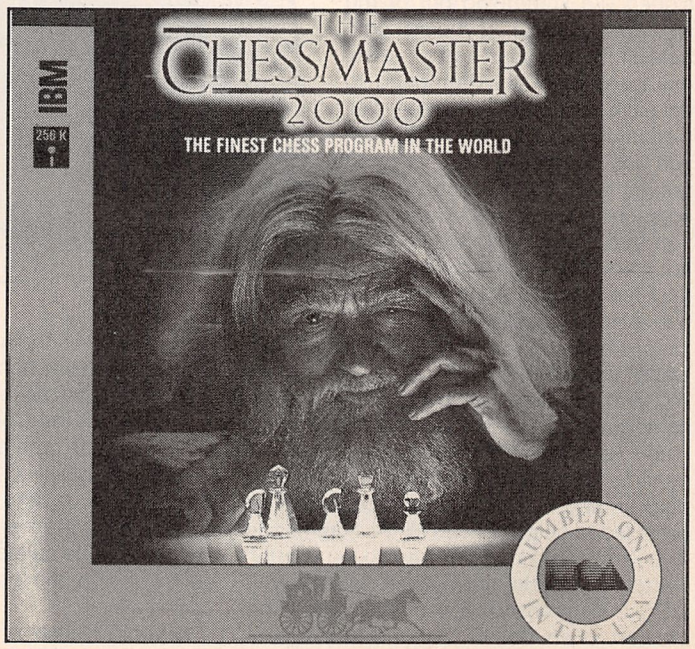
Initially at least, EA will be bringing UK customers up to date with its US catalogue, with simultaneous release in the US, Europe and Japan thereafter. But Mark Lewis, director of European publishing, makes it clear that EA is looking further ahead.

"In five years' time, there will be a dominant interactive machine, and it won't be an ST or an Amiga. We're well positioned to ride the waves of the future," he says.

Lewis is referring to CD-based technology, which in the opinion of many will provide the great leap forward in home computing, enabling micros to link up with video and hi-fi in a whole entertainment system.

Lewis reckons the US will adopt this in five years, with Europe not far behind.

For a foretaste of what EA has to offer the UK customer, see pages 16 and 17.



Hooked to the silver screen

It's perhaps surprising more companies haven't produced programs which will put computer-generated captions on video film for the home market. Datasoft's Video Title Shop does just that. Chris Jenkins found it hard going but the results quite pleasing.

Statistics show that market penetration of home computers and video recorders often coincide; in other words, if you've got one it's likely you have the other.

However, apart from fairly expensive video digitisers, and even more expensive Genlock systems which combine video and computer images, there are surprisingly few products which exploit the many possibilities of both computers and videotape.

If you shoot your own home videos on a regular basis, or just hire a video camera for a family wedding or court appearance, *Video Title Shop* will allow you to give your finished tapes a more professional appearance. It's a disc-based package for the Commodore 64 and compatibles which is largely designed for adding caption screens and simple illustrations to video tapes – hooking the computer up to the VCR is pretty straightforward, and is explained with clear examples in the manual.

Unfortunately, despite being copyright 1987, *Video Title Shop* is designed like something out of the ark, with clumsy keyboard controls, limited options and an abysmal jokey manual. Attempting to set all these problems aside, I was pleasantly surprised to find that you can eventually achieve good results with the package – but someone ought to explain to Datasoft that many inexperienced video users might appreciate a more user-friendly approach, or dare one even suggest Wimps?

To create text screens, options are selected using the cursor keys, Commodore key and a string of command keys, or in some cases a joystick. Some of the command keys are ridiculous – Run/Stop to confirm an option selection? A command display and a quick reference card are provided to help you with all the commands – but if the program had been better written, it wouldn't have been necessary.

Each different section of text has to be created as an 'object' with a specific 'pen' (four are available), font and colour. Text lines are assembled on 'pages' (which can be bigger than the screen), and which are then combined to form 'sequences'.

Needless to say, any of these can be saved to disc, and though there is a memory limit on the number of pages which can be stored at once, judicious editing of your videotape makes this fairly irrelevant.

Any four of the Commodore's 16 colours can be used to create text lines in font sizes from 8 × 8 to 64 × 64 pixels. These can be centred, left or right justified, copied, and moved around the screen. Text frames should then be saved to disc before you go on to design the graphic background for your titles.

Graphic Painter is a simple little drawing utility (loaded separately) with all the usual facilities; lines, polygons, fills, fill edit, border colour, brush shape and so on. It allows you to use all 16 of the 64's colours; you can then combine a text screen with a graphic screen to create a complete page.

The exciting part (at last) is using the special effects options to create an animated rather than static sequence. You can slide one page over or under another from any direction, place the text across the graphic one letter at a time, have one page push another off the screen, or "fizzle" (fade pixel by pixel) from one page to another.

The demo sequences give you a good idea of what can be achieved by combining these effects. This is really the only aspect of the package which gives it any advantage over an otherwise infinitely superior product such as Rainbird's *Advanced Art Studio.*

I tried very hard to like this package, because the basic idea is good and it offers some facilities which I very much wanted to have available for my own video work.

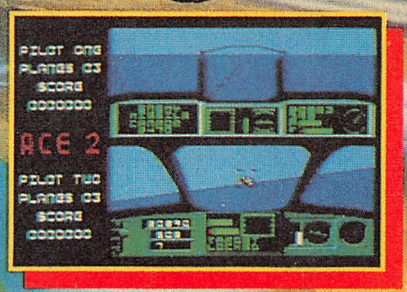
However, the control systems are poor, the text fonts offered are very unimaginative and the whole thing is well below the standard you would expect.

You can't, for instance, format discs from within the program, or hold more than two fonts in memory at any time, or import graphics from any other art programs (except some obscure American packages which I'm sure no-one uses over here). The potential for a truly useful, ingenious product is there, but someone appears to have slipped up on the 'ease of use' factor. Overall a case of nice video – shame about the software.

Product *Video Title Shop* **Micro** Commodore 64 with disc drive **Price** £14.99
Supplier US Gold, Units 2-3, Holford Way, Holford, Birmingham B6 7AY.

ACE 2

- *High speed one or two pilot action.*
- *Computer opponent has advanced artificial intelligence at 20 skill levels.*
- *Comprehensive options.*



- *Air-air and air-ground combat.*
- *Real time, real space action.*
- *Equipped with two aircraft types and a variety of modern missiles.*

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ACE 2
THE ULTIMATE HEAD TO HEAD CONFLICT

Screen shots are taken from the C64 version

Left: *Chessmaster 2000*, digitised voices and 3D graphics. Below: Arctic Fox, now being converted to the Spectrum and Amstrad CPCs.

Games without frontiers

Peter Worlock, a long time Electronic Arts fan, samples some of its new UK titles.

There is a body of opinion that says Electronic Arts is the best games publisher anywhere in the world.

To many British computer owners, especially users of British machines like Amstrads and Spectrums, that may sound like an outrageously controversial statement.

However, the imminent launch of Electronic Arts on to the UK software scene is certain to win the company a horde of new fans – especially among games players who want more than mindless action.

Not that the games are unstintingly cerebral. It's just that Electronic Arts specialises in games that require a good deal of thought and strategic planning.

Some of its earlier products – especially on the Commodore 64 – will be familiar to some *Popular* readers. Games like *The Bard's Tale,* probably the best fantasy role-playing game to date; *Archon,* a combination of chess and arcade action; and *Seven Cities of Gold* and *Heart of Africa,* unusual combinations of historical simulation and graphic adventure.

Among the torrent of new releases on the way in September, the big-selling American machines continue to predominate: IBM PC, Commodore 64 and Amiga. But for the first time, Spectrum and Amstrad owners will be able to form their own judgements on the quality of Electronic Arts' games.

First of these conversions will be *Arctic Fox* a 3D tank simulator set in the polar wastes.

Animation is slick with solid filled wire-frame graphics showing mountains, crevasses, and a host of alien hardware including enemy tanks, missile launchers, mines, communications towers and some superbly animated flying machines.

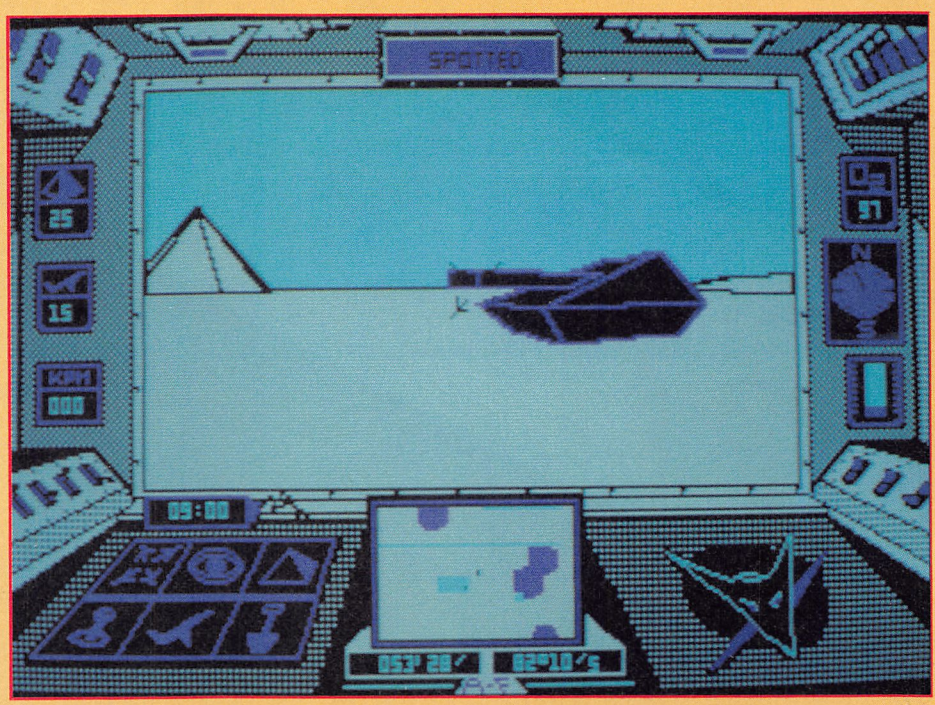
Versions will be coming on Spectrum and Amstrad cassette, and on Amstrad disc.

Electronic Arts has some excellent Amiga software coming too. Foremost among these is *Chessmaster 2000,* with digitised voice, training modes, opening book, variable difficulty levels and the graphics are a treat in 3D.

There's also *Earl Weaver Baseball.* Old Earl, apparently, is one of the highest ranking baseball coaches, and the game features both coaching strategy and arcade action, with hints, tutorials and admonitions from the great man himself.

Commodore 64 owners are not excluded from the new releases with two offerings, *EOS* and *Legacy of the Ancients.*

Legacy is a fantasy role-playing game, a sort of combination of the *Ultima* series and *The Bard's Tale.* The game is enormous with literally thousands of locations to explore, monsters to fight, puzzles to solve and treasures to win.



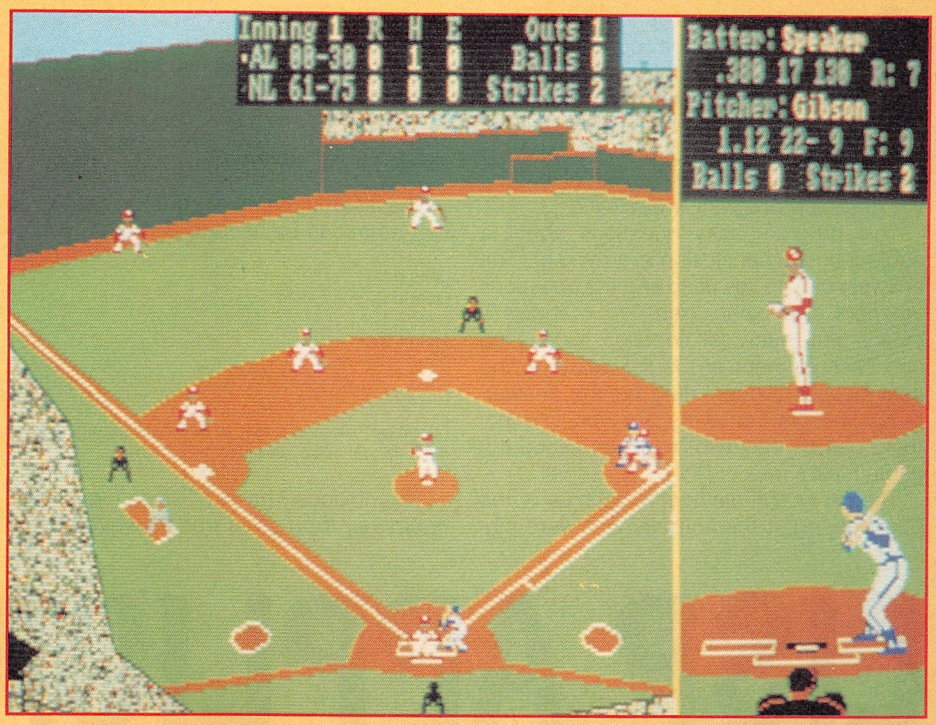
There are some excellent spot graphics, but I found the presentation a bit disappointing (everyone has their off days).

EOS is a different story. This is a marvellously complex game of space exploration.

There are a number of scenarios of increasing difficulty, beginning with the relatively simple task of building a profitable space station in Earth orbit, advancing to the development of sophisticated stations such as lunar mining and ore processing stations, space hospitals, and eventually mobile stations which develop colonies on other planets and moons.

The game is brilliantly executed, with satellite news broadcasts, detailed, high-tech graphics, and the option of playing against up to three opponents, either human or computer-controlled.

Amiga	
Chessmaster 2000	£24.95
Earl Weaver Baseball	£24.95
Deluxe Paint II	£69.95
Amstrad CPC	
Arctic Fox (cassette)	£8.95
Arctic Fox (disc)	£14.95
Atari ST	
Chessmaster 2000	£24.95
Degas Elite	£24.95
The Bard's Tale	£24.95
Music Construction Set	£24.95
Commodore 64	
World Tour Golf	£12.95
Chessmaster 2000	£14.95
EOS	£16.95
Legacy of the Ancients	£16.95
Pegasus	£14.95
IBM PC	
Arctic Fox	£19.95
Marble Madness	£19.95
World Tour Golf	£19.95
Chuck Yeager Flight Trainer	£24.95
Chessmaster 2000	£24.95
Starflight	£24.95
Adventure Construction Set	£14.95
The Bard's Tale	£24.95
Grandslam Bridge	£24.95
Spectrum	
Arctic Fox (cassette)	£8.95



Above: *Earl Weaver Baseball*, with hints, tutorials and admonitions from the great man himself.

Two goodies for Atari ST owners are the incomparable *Bard's Tale*, and *Music Construction Set*.

But probably the most favoured group of users are those owning IBM PCs, and clones like the Amstrad PC1512. If you're looking for a break from spreadsheets and databases, Electronic Arts has a feast awaiting. Leading the field is *Chuck Yeager's Advanced Flight Trainer*, a flight simulator blessed by Mr Right Stuff himself with a host of options.

Fly 14 different planes, from a Sopwith Camel, a Spitfire and a P-51 Mustang, to the X-1 rocket ship, and modern F-16 and F-18 fighter/bombers.

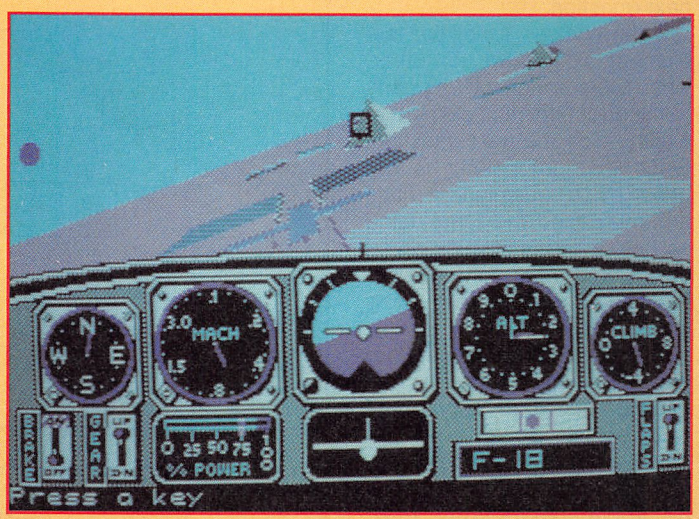
The main feature, apart from the great graphics, is a training mode in which Yeager teaches you to fly.

Not better than SubLogic's *Flight Sim II* . . . merely different. Serious would-be pilots will want both.

Also on the IBM list, *Chessmaster 2000*, *World Tour Golf*, and *The Bard's Tale*.

Nowhere in the catalogue will you find *Uridium* clones, or platforms and ladders games – the kind of fast action stuff at which British programmers excel. What you will find are probably the best games of their kind.

All in all, Electronic Arts' entry into the UK market is like Christmas come early for lovers of serious computer entertainment.



Above: Chuck Yeager, Mr Right Stuff's *Flight Trainer*. Left: *Legacy of the Ancients*, a fantasy role playing game.

LISP APPLICATIONS

In the final part of our series on Lisp, Kenn Garroch looks at some practical applications of the language.

So far, I've looked at various features of the Lisp language but not at any particular applications. Lisp is mainly used in artificial intelligence programming (A1) and is suited to this because of the way it handles information. One aspect of A1 is expert systems, and the simplest of these is the guessing program 'what is it?'

This program asks questions about a subject until a conclusion is arrived at. The answers can be yes or no and the questions are held in a binary tree. Fig 1 shows a binary tree, each list contains a question and each element of the list points to the next question, depending on the answer. Since the only answers are yes and no, there can be only two branches hence the name binary tree.

The car or first element in each list is the question, eg, if the first element were big, the program asks 'is it big?'. If the reply is yes, then the list pointed to by 'big' is used in the next question.

If the answer is no, the last element in the list (or other, since there are only two) points to the no list, the first element of which holds the next question. Since the 'no' pointer is not used as a question, I have arbitrarily used the same name as before but just stuck an 'x' on the end (plus there are not too many English words ending in x).

The main program therefore has to move down the tree picking out the appropriate questions, depending on whether the answer is yes or no. The important point is reached at the bottom of the tree when there are no more questions.

There are two cases: one, when a line of questioning comes up against a no, and there are no more questions to be asked, and secondly, when the questioning comes to a yes and there are no more questions.

In the first case, the head element in the list points to *t*, ie, it has no list attached to it, just the atom *t* (true). Similarly, the second case comes up against the last element in the list which also points to *t*. For instance, take the list top, ie:

```
(setq top (a b))
```

Then attach another two lists to each of the elements:

```
(setq a (c d))
(setq b (e f)) (see figure one)
```

The last four items need to be set to *t* so that atom can be used to find them so:

```
(setq c t)
(setq d t)
(setq e t)
(setq f t)
```

Now try:

```
(atom top) Atom is a test to see if its argument is an
atom (ie, not a list), and if so, returns true.
```

This obviously gives nil since *top* is a list, *(atom (car top))* gives true, however, this is not surprising since *(car top)* is *a* and *a* is an atom. To find out if *a* points to a list, *(atom (eval (car top)))* is used.

This evaluates the car of top, ie, *a*, and gives the correct result nil since *a* points to a list and not an atom.

Moving down the tree one layer, the same test can be tried on the list *a* and gives the result true since *c* points to *t* which is an atom *(try (atom t))*. The test *(atom (eval (car m)))* where *m* is a list can therefore be used to find the end of the tree for yes's.

For no's, the situation is slightly different since the cdr of a list is also a list. To see if it points to the atom *t, (eval (car (cdr m)))* must be used. The car of the *cdr,* ie, the first of the remainder can also be written *cadr* so, *(eval (cadr m))* is used for no's.

The guess function is recursive, ie, it calls itself. The recursive aspect of Lisp always comes in useful in situations like this since the same process is happening over and over, only the arguments change. When neither y or n has been answered, *Huh?* is printed and guess is called again with the same argument.

On finding that there is no more tree left, more information can be added. The functions *newt* and *newf* add yes and no branches respectively. In the yes case, more description is asked for, ie, 'what kind of . . . is it?'

Note the use of 1 in the print statements. This causes Lisp to ignore the fact that there is a space being printed; in fact, it is needed when any non-alphanumeric is printed, otherwise Lisp will try and use it as a function, or treat space in the normal way as a separator. *newf* is used when the function cannot get a result, ie, n is the reply, and the end of the tree is reached. 'What is it?' asks for a new object that can be added into the structure.

To start the program off, the new function is needed to set up the first pointers and questions. For example, the first list to be used is called top, and the question is big. So *(new top big)* sets up top to point to the list *(big bigx)* and sets *big* and *bigx*

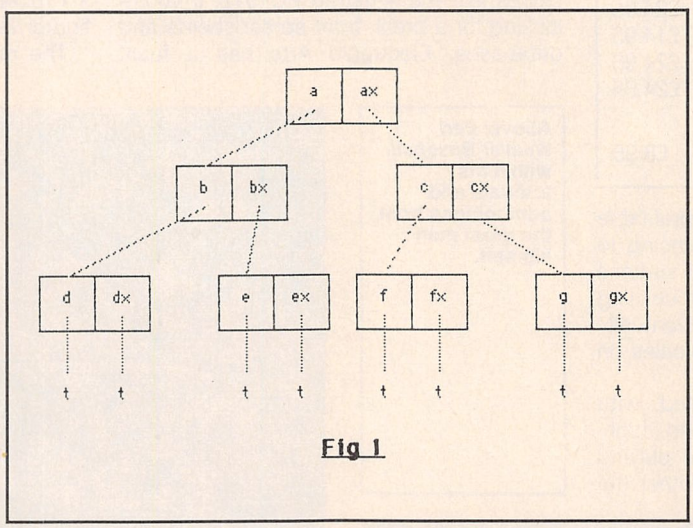


Fig 1

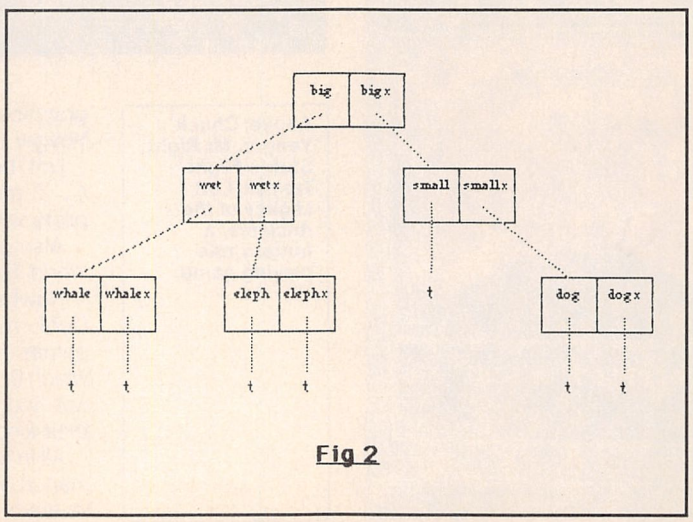


Fig 2

to point to atoms, in this case *t*.

Now, *(guess top)* starts off with the question, 'is it big?', to which there are two answers, y or n. In the first case, it will then ask what kind of big is it so (regarding fig 2) an answer could be wet.

After the new item has been entered, guess finishes and can be restarted with *(guess top)*. Now, 'is it big?' answered with y gives 'is it wet?' and if yes is the answer, what kind of wet is it will be asked.

The layout in fig 2 shows how the tree grows. Yes's go to the left and no's go to the right. One thing to notice about the guess function is that it can be short circuited by repeating an answer. In case of fig 2, answering big instead of whale causes problems since it resets big to point to the atom *t*.

This can be useful in that branches can be joined together but it can cause difficulties more often than not. A search through the oblist would solve the problem but would slow the program down.

There are a number of refinements that can be made to *guess*, first of all, only single words can be entered as replies so, the English syntax sometimes seems a little weird.

A more sophisticated version could be written using maybe (or don't know) as a possible answer. The results would then depend on previous answers and probabilities (a true expert system).

```
(de guess (m)
      (princ 'is! it! )
      (print (car m))
      (setq ip (read))
      (cond ((equal ip 'y)
                  (cond ((atom (eval (car m))) (newt m))
                        (t (guess (eval (car m))))))
            ((equal ip 'n)
                  (cond ((atom (eval (cadr m))) (newf m))
                        (t (guess (eval (car (cdr m)))))))
            (t (print 'Huh!?) (guess m))))

(de newt (lst)
      (princ 'what! kind! of! )
      (prin (car lst))
      (printc 'I is! it!?)
      (setq ip (read))
      (set (car lst) (list ip (addx ip)))
      (set ip t)
      (set (addx ip) t))

(de newf (lst)
      (printc 'What! is! it!?)
      (setq ip (read))
      (set (cadr lst) (list ip (addx ip)))
      (set ip t)
      (set (addx ip) t))



(de new (name first)
      (set name (list first (addx first)))
      (set first t)
      (set (addx first) t))

(de addx (name)
      (compress (list name 'x)))
```

Implementations of Lisp

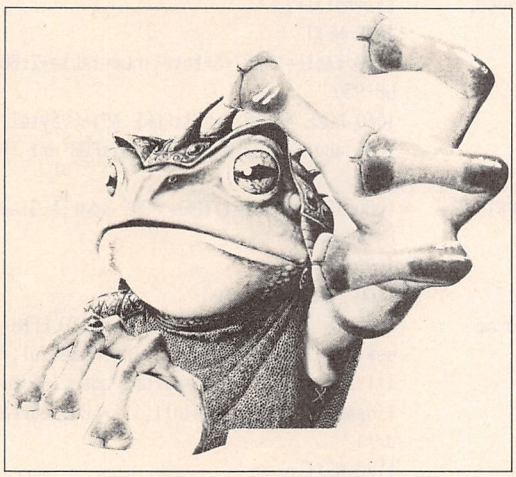
Lisp Rom **Micro** BBC **Price** £49.00 **Supplier** Acornsoft/Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX

Cambridge Lisp **Micro** Atari ST **Price** £149.95 **Supplier** Metacomco, 26 Portland Square, Bristol

Cambridge Lisp **Micro** Commodore Amiga **Price** £149.95 **Supplier** Metacomco, address as above

ST Lisp **Micro** Atari ST **Price** £90.00 **Supplier** Robinson Micro Systems/Silica Shop, 1–4 The Mews, Hatherley Mews, Sidcup, Kent

XLisp (Public Domain) **Micro** Atari ST **Price** Club membership subscription plus £3.50 per disc **Supplier** ST Club, PO Box 20, Hertford SG13 8NN



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HEWSON

Custom RSX Manager

Simon T Goodwin

Individual RSX commands are published regularly in *Popular Computing Weekly*, but it is often very difficult to merge them together into one machine code program to use in your own programs. This program allows you to do just that. It allows the user to create a database of RSX's from which any number of commands can be selected to create a customised Basic extension package. To store the data it uses an extra 16K bank of Ram, thus making it compatible only with the CPC 6128 or an expanded 464/664. This is a very complex program which will probably only be of use to people with a knowledge of machine code.

An RSX command can be separated into two parts: the RSX table and the actual machine code program. This machine code section must be relocatable, or else it connot be placed into the database. The database ignores the RSX table. The user must make a note of the memory address and the length of the machine code section (not the RSX table) before loading a file into the database.

Menu options

When the program is run, a menu containing nine options is displayed. To select an option use the up and down cursor keys and the Copy key. Of these options Disc/Tape Catalogue and Exit program are self-explanatory. There now follows an explanation of the other options.

The Load Machine Code Data option allows the user to load in a file containing one or more RSX commands. The file is loaded to the address specified by its header. Files should not be loaded in below address 13000. You do not have to worry about load files sequentially. Once an RSX routine has been stored (using the following option) you can forget about the original code. Once a file is in memory RSX's can be "plucked" from it using the Store RSX Routine option. To place an RSX into the database the user must specify the name of the RSX (this need not be the same name as the original RSX), and the address and length of its machine code section. Ordinary machine code programs can also be transformed into RSX's with this option. The database can hold up to 16K of machine code routines. Once an RSX has been entered into the database a hex dump of it can be displayed using the Hex Dump or RSX Routine option.

This two part listing is available on tape (£3) or disc (£5.50) from 41 Fountains Drive, Acklam, Middlesbrough, Cleveland TS5 7LW.

```
1 REM --------------------------------
2 REM --      Custom RSX Manager      --
3 REM --   By Simon.T.Goodwin 1987    --
4 REM --------------------------------
5 REM
30 MODE 2
40 INK 0,0:INK 1,26
50 PAPER 0:PEN 1:BORDER 0
60 DIM name$(100),addr(100),length(100),
flag(100)
65 marker=16384:mak=1
66 FOR n=1 TO 100:name$(n)=STRING$(15,"
"):NEXT
70 GOSUB 9000
80 :
82 :
84 :
90 WHILE 1
100 CLS
110 PAPER 1:PEN 0
120 LOCATE 20,1:PRINT " Custom RSX Manag
er....By ST Goodwin 1987 "
125 PAPER 0:PEN 1
150 LOCATE 30,4:PRINT "Load machine code
 data"
151 LOCATE 30,6:PRINT "Save custom RSX t
able"
155 LOCATE 30,8:PRINT "Store RSX routine
"
156 LOCATE 30,10:PRINT "Hex Dump of RSX
routine"
160 LOCATE 30,12:PRINT "View RSX databas
e"
190 LOCATE 30,14:PRINT "Save RSX databas
e"
195 LOCATE 30,16:PRINT "Load RSX databas
e"
215 LOCATE 30,18:PRINT "Disc/Tape catalo
gue"
220 LOCATE 30,20:PRINT "Exit program"
225 LOCATE 13,24:PRINT "Use p and q keys
 to move and press COPY to select option
"
230 PRINT CHR$(23);CHR$(1);:TAG
240 position=1:op=9:GOSUB 400
249 WHILE INKEY(9)
250 IF INKEY(2)=0 AND position<op THEN G
OSUB 400:position=position+1:GOSUB 400
260 IF INKEY(0)=0 AND position>1 THEN GO
SUB 400:position=position-1:GOSUB 400
280 WEND
285 TAGOFF:PRINT CHR$(23);CHR$(0):
290 select=position
300 ON select GOSUB 2500,1000,2000,4000,
5000,8500,8000,6000,7000
310 WEND
320 END
330 :
340 :
350 :
400 MOVE 29*8,350-(position*32)+32:PRINT
 STRING$(24,CHR$(143));:RETURN
410 :
500 PAPER 1:PEN 0
510 PRINT " Press a key to return to men
u "
512 PAPER 0:PEN 1
515 FOR n=1 TO 255:CALL &BB1B:NEXT
520 WHILE INKEY$="":WEND
530 RETURN
540 :
600 PRINT "Are you sure? (Y/N)"
605 FOR n=1 TO 255:CALL &BB1B:NEXT
610 WHILE INKEY(43) AND INKEY(46)
620 WEND
630 RETURN
640 :
800 MOVE (128*locx)-128,398-(locy*16)+16
:PRINT STRING$(15,CHR$(143));:RETURN
810 :
950 byte2=INT(num/256):byte1=num-(byte2*
256):RETURN
997 :
998 :
999 :
1000 REM Save RSX table
1005 CLS
1010 POKE 49152,33:POKE 49153,9:POKE 491
54,64
1020 POKE 49155,1:POKE 49156,13:POKE 491
57,64
1030 POKE 49158,&C3:POKE 49159,&D1:POKE
49160,&BC
1040 POKE 49161,0:POKE 49162,0:POKE 4916
3,0:POKE 49164,0
1047 total=0
1048 FOR n=1 TO 100:IF flag(n)=1 THEN to
tal=total+1
1049 NEXT
1050 table=16397+3*total:num=table+2:GOS
UB 950
1060 POKE 49165,byte1:POKE 49166,byte2
1070 addr=49167:stored=49167:FOR n=1 TO
100
1080 IF flag(n)=1 THEN POKE addr,&C3:add
r=addr+3
1090 NEXT
1100 FOR n=1 TO 100
1105 IF flag(n)=1 THEN FOR i=1 TO LEN(na
me$(n))-1:POKE addr,ASC(MID$(name$(n),i,
1)):addr=addr+1:NEXT i:POKE addr,ASC(MID
$(name$(n),LEN(name$(n)),1))+&80:addr=ad
dr+1
1120 NEXT n
1125 addr=addr+1
1130 stored=stored+1:FOR n=1 TO 100
1140 IF flag(n)=1 THEN CALL 12521,4:CALL
 12500,addr(n),addr,length(n):CALL 12521
,0:GOSUB 1500:addr=addr+length(n)+1
1150 NEXT
1155 addr=addr+1
1160 CALL 12500,49152,16384,16384
1165 FOR n=1 TO 255:CALL &BB1B:NEXT
1170 PRINT:PRINT:PRINT:INPUT "FILENAME >
",f$
1180 SAVE f$,b,16384,addr-49152
1190 RETURN
1300 END
1500 num=addr-16384-16384:GOSUB 950:POKE
 stored,byte1:stored=stored+1:POKE store
d,byte2:stored=stored+2:RETURN
1997 :
```

PROGRAMMING: AMSTRAD CPC6128

```
1998 :
1999 :
2000 REM Store RSX routine
2010 CLS
2012 IF mak>100 THEN PRINT "No more room
.":GOSUB 500:RETURN
2015 FOR n=1 TO 255:CALL &BB1B:NEXT
2030 INPUT "Name of RSX  (less then 15 c
hars) >",r$
2031 IF LEN(r$)>14 THEN 2030
2035 r$=UPPER$(r$)
2040 INPUT "Address of RSX routine >",ad
2041 IF ad<0 OR ad>65536 THEN PRINT "Ill
egal Location":PRINT:GOTO 2040
2050 INPUT "Length of RSX routine >",le
2051 IF le<1 OR le>16384 THEN PRINT "Ill
egal Length":PRINT:GOTO 2050
2070 CALL 12521,4
2080 CALL 12500,ad,marker,le
2085 CALL 12521,0
2100 name$(mak)=r$:addr(mak)=marker:leng
th(mak)=le:flag(100)=0:mak=mak+1
2110 marker=marker+le+1
2115 PRINT "There are now ";32768-marker
;"bytes free to store RSX's"
2116 PRINT:GOSUB 500
2120 RETURN
2200 :
2210 :
2220 :
2500 REM Load machine code
2510 CLS
2520 FOR n=1 TO 255:CALL &BB1B:NEXT
2530 INPUT "Filename >",f$
2540 LOAD f$
2550 RETURN
3997 :
3998 :
3999 :
```

PROGRAMMING: COMMODORE 64

Pointer Driver

Iain Murray

This short machine code interrupt routine forms the basis of a mouse driven pointer system. It creates a pointer which appears on the screen, and can be moved about under control of a NEOS (or compatible) mouse, within the boundaries of the screen. Once the pointer system is running, other software can be loaded, and the pointer will still work as long as the interrupt vector is not changed.

The mouse pointer is sprite 0, and its co-ordinates can be read as usual at 53248 ($DØØØ) for *X* and 53249 ($DØØ1) for *Y*. Pointer colour is stored at 53287 ($D027). The routine also provides data on low-res screen co-ordinates on the 40×25 text screen.

These are at 53ØØØ ($CFØ8) for *X* and 53001 ($CFØ9) for *Y*. The on/off condition of the two mouse buttons can be read at 53002 ($CFØA) and 53003 ($CFØB) for the left and right buttons respectively.

The machine code occupies memory from 52224 ($CCØØ) to 53005 ($CFØD), leaving the 3K block from 49152 ($CØØØ) to 52223 ($CBFF) free for your own use.

Remember that the NEOS mouse can be used like a joystick if it is plugged in with the left mouse button held down. However, this program allows full freedom, taking advantage of the mouse's full capabilities.

```
100 REM *** NEOS MOUSE DRIVER SOFTWARE ***
110 REM *** BY IAIN MURRAY (C) 1987 ***
120 REM *** FOR POPULAR COMPUTING WEEKLY ***
200 PRINT "■■■■■■■■■■■■ NEOS MOUSE DRIVER SOFTWARE ■"
210 PRINT "■■■■■■■■PLEASE WAIT WHILE DATA IS READ IN"
220 C=0:A=52224
230 READ D:IF D<0 THEN 250
240 POKE A,D:C=C+D:A=A+1:GOTO 230
250 IF C=54548 AND A=52744 THEN 270
260 PRINT "■■■■■■■CHECKSUM ERROR IN DATA!":END
270 PRINT "■■■■■■■START SOFTWARE WITH 'SYS 52224'"
280 PRINT "■■■■READ MOUSE X COORDINATE AT 53000"
290 PRINT "■■■■READ MOUSE Y COORDINATE AT 53001"
300 PRINT "■■■■READ LEFT MOUSE BUTTON  AT 53002"
310 PRINT "■■■■READ RIGHT MOUSE BUTTON AT 53003"
320 END
1000 DATA 160,0,185,198,205,153,192,2,200,192
1010 DATA 64,208,245,169,172,141,0,208,141,1
1020 DATA 208,169,11,141,248,7,169,1,141,39
1030 DATA 208,141,21,208,120,169,47,141,20,3
1040 DATA 169,204,141,21,3,88,96,8,72,152
1050 DATA 72,138,72,32,78,204,32,210,204,32
1060 DATA 168,205,104,170,104,168,104,40,76,49
1070 DATA 234,234,234,234,202,208,250,96,173,0
1080 DATA 220,72,173,1,220,72,173,2,220,72
1090 DATA 173,3,220,72,169,16,141,2,220,173
1100 DATA 0,220,41,239,141,0,220,162,5,32
1110 DATA 71,204,173,0,220,10,10,10,10,141
1120 DATA 6,206,173,0,220,9,16,141,0,220
1130 DATA 162,5,32,71,204,173,0,220,41,15
1140 DATA 13,6,206,141,6,206,173,0,220,41
```

continued on page 22 ▶

PROGRAMMING: COMMODORE 64

◀ continued from page 21

```
1150 DATA 239,141,0,220,162,5,32,71,204,173
1160 DATA 0,220,10,10,10,10,141,5,206,173
1170 DATA 0,220,9,16,141,0,220,162,5,32
1180 DATA 71,204,173,0,220,41,15,13,5,206
1190 DATA 141,5,206,104,141,3,220,104,141,2
1200 DATA 220,104,141,1,220,104,141,0,220,96
1210 DATA 173,6,206,240,119,201,128,176,65,173
1220 DATA 0,208,56,237,6,206,176,9,72,173
1230 DATA 16,208,41,1,240,14,104,141,0,208
1240 DATA 173,16,208,41,1,208,19,76,251,204
1250 DATA 104,173,0,208,201,24,176,76,169,24
1260 DATA 141,0,208,76,78,205,173,0,208,201
1270 DATA 128,144,61,173,16,208,41,254,141,16
1280 DATA 208,76,78,205,169,0,56,237,6,206
1290 DATA 24,109,0,208,141,0,208,173,16,208
1300 DATA 41,1,240,15,173,0,208,201,85,144
1310 DATA 23,169,85,141,0,208,76,78,205,173
1320 DATA 0,208,201,24,176,8,173,16,208,9
1330 DATA 1,141,16,208,173,5,206,240,53,201
1340 DATA 128,144,24,169,0,56,237,5,206,24
1350 DATA 109,1,208,176,6,141,1,208,76,118
1360 DATA 205,173,1,208,76,118,205,173,1,208
1370 DATA 56,237,5,206,201,50,176,5,169,50
1380 DATA 76,133,205,201,248,144,2,169,248,141
1390 DATA 1,208,173,25,212,201,255,208,5,169
1400 DATA 1,76,150,205,169,0,141,11,207,173
1410 DATA 0,220,74,74,74,74,73,255,41,1
1420 DATA 141,10,207,96,173,16,208,74,173,0
1430 DATA 208,106,74,74,56,233,3,141,8,207
1440 DATA 173,1,208,56,233,50,24,74,74,74
1450 DATA 141,9,207,96,128,0,0,192,0,0
1460 DATA 224,0,0,240,0,0,248,0,0,252
1470 DATA 0,0,254,0,0,255,0,0,252,0
1480 DATA 0,248,0,0,220,0,0,12,0,0
1490 DATA 14,0,0,7,0,0,6,0,0,0
1500 DATA 0,0,0,0,0,0,0,0,0,0
1510 DATA 0,0,0,0,0,0,0,0,0,0,-1
```

PROGRAMMING: BBC B

Sprite Animator

Tim Fox

This suite of programs will allow you to define sprites and then animate them.

Type in listing 1 and save it with *SAVE "SPRITE" C00 CDD. Then, enter listing 2, the sprite definition program, and save it.

To define your sprite, enter PAGE=&1D00 and CHAIN the program. The controls are self explanatory but, the cursor keys move the cursor around, a number key or letter *A–F* fills the present grid square with that colour (in hex).

S saves a sprite, once you press a number for the filename.

V and then a number or letter *A–F* will fill the present vertical column with that colour.

H will do the same except on a horizontal basis. *O* for help on the controls.

Escape will bring you back to the grid.

W and then a number or letter *A–F* will fill the entire grid in that colour.

P will print the sprite in actual size.

More details and the rest of the listings next week.

Listing 1

```
10FORS=0TO3STEP3
20P%=&C00
30[OPTS
40.start
50STX &7C:STY &7D
60.loop
70LDX &7C:LDY &7D
80JSRscreenloc
90JSRdraw
100LDX &7C:LDY &7D
110JSRscreenloc
120LDA &84:CMP#0:BNE hop2
130LDA#19:JSR &FFF4
140.hop2
150JSR draw
160LDX &7C
170TXA
180CLC:ADC &7E
190STA &7C
200CMP &7F:BEQ out
```

```
210LDY &7D
220TYA
230CLC:ADC &80
240STA &7D
250CMP &81:BEQ out
260JMP loop
270.out RTS
280.draw LDA &82:STA &77:STA &78
290LDA &83:STA &70
300LDA &84
310CMP#&FF:BNE hop
320LDA#19:JSR &FFF4
330.hop
340LDA&86:STA vert+2
350LDA&85:STA vert+1
360LDX#0
370.loop LDA &73:AND#&F8
380STA &75
390LDA &74:STA &76
400LDA &73:AND#7
410TAY
420.vert LDA &900,X
430EOR(&75),Y
440STA(&75),Y
450INX:BEQ MSB
460.en1 INY:CPX &78
470BEQ en2
480CPY#8:BNE vert
490LDA &75:ADC#&7F
500STA &75
510LDA &76:ADC#2
520STA &76
530LDY#0:BEQ vert
540.MSB INC vert+2:JMP en1
550.en2 CLC
560LDA &73:ADC#8
570STA &73:BCC skip
580INC &74
590.skip CLC
600LDA &78:ADC &77
610STA &78
620DEC &70:BNE loop
630RTS
640.screenloc LDA#&30:STA &7A
650LDA#0:STA &7B
660TYA:AND#7
670STA &79
680TYA
690LSRA:LSRA:LSRA:ASLA
700TAY
710TXA
720ASLA:ROL &7B
730ASLA:ROL &7B
740ASLA:ROL &7B
750ADC &79
760ADC &C376,Y:STA &73
770LDA &7B
780ADC &7A
790ADC &C375,Y:STA &74
800RTS
810]
820NEXT
830PRINT''"Now type *SAVE SPRITE C00 C
DD"
```

Listing 2

```
  100ERROR PROCerr:GOTO200
  20REM SPRITE DESIGNER
  30REM BY TIM FOX
  40FL=FALSE
  50
  60FORA%=&1900TO&1CF0STEP4:!A%=0:NEXT
  70MODE7:VDU23,1;0;0;0;0
  80INPUT''"How many pixels(not bytes)
in the X     direction (even nos. only p
lease,       range 2-20) ]"X%
  90IFX%MOD2<>0 ORX%<2ORX%>30VDU7:GOTO7
0
 100INPUT''"How many pixels in the y di
rection      (odd OR even amounts  allow
ed, range    0-50) ]"Y%
 110IFY%<1ORY%>50VDU7:PRINTTAB(0,7)STRI
NG$(100," "):PRINTTAB(0,5);:GOTO100
  120MODE2:VDU23,1;0;0;0;0
  130COLOUR1:PRINTTAB(14)"Q-Help"
  140IFX%>=Y%*.5 XU%=1000/X%:PROCxround:
YU%=XU%*.5:PROCyround
  150IFY%*.5>X% YU%=1000/Y%:PROCyround:X
U%=YU%*2:PROCxround
  160X=0:Y=0
  170PROCgrid
  180X=0:Y=0
  190*FX4,1
  200REPEAT
  210COLOUR6:PRINTTAB(16,29);"X:";X;
  220PRINTTAB(16,30);"Y:";Y;
  230*FX15,0
  240PROCcursor
  250G=GET
  260PRINTTAB(16,29)SPC4;TAB(16,30)SPC4;
  270PROCcursor
  280IF(G>47 ANDG<58)OR(G>64 ANDG<71) TH
ENPROCpoint(EVAL("&"+CHR$G))
  290IFG=136X=X-1
  300IFG=137X=X+1
  310IFG=138Y=Y-1
  320IFG=139Y=Y+1
  330IFX=X% X=0
  340IFX<0 X=X%-1
  350IFY=Y% Y=0
  360IFY<0 Y=Y%-1
  370IFG=ASC"P"PROCprint
  380IFG=ASC"S"PROCsave
  390IFG=ASC"W"PROCwipe
  400IFG=ASC"V"PROCvert
  410IFG=ASC"H"PROChoriz
  420IFG=ASC"Q"PROChelp
  430UNTILO
  440DEFPROCxround
  450IF(XU% MODG<>0 AND((XU% MODG)/8 <=.
5)) THEN XU%=8*(XU%/8-(XU% MODG)/8)
  460IF(XU% MODG<>0 AND((XU% MODG)/8 >.5
)) THEN XU%=8*(XU%/8+(1-(XU% MODG)/8))
  470ENDPROC
```


ADS

Adam Newby

ADS is an assembler and disassembler system that will be presented over three weeks.

Type in the program and save it with CSAVE. Do not type the TRAP statements until you are sure the program works. On running the program, the prompts, "Max-number of lines?" and "Max number of labels?" will appear. This is to save memory space – the less lines, the less memory is taken up by variables.

After the computer has finished its initialisation, you will get the prompt, "Press: 1 for assembler, 2 for disassembler." Pressing 1 will display the assembler menu, which gives the following functions:

1 – Write new program. This is where you type in your assembly language program. Type the line number (this doesn't have to be a number, any kind of symbol will do), then press Return. Now type the instruction, then press Return again. Next type the operand and press Return once more. If there is no operand, just press Return. When you have finished typing in your program, type as the instruction. The menu will be displayed again.

Instructions should be entered in the following way:

(a) Instructions using immediate addressing have a "#" suffix, so LDA (immediate) is LDA#.

(b) Instructions using absolute, relative or implied addressing have no suffix, so STX

continued on page 24 ▶

◀ continued from page 23

(absolute) is just STX, BEQ (relative) is just BEQ and DEX (implied) is just DEX.

(c) Instructions using zero page addressing have a Z suffix, so ADC (zero page) is ADCZ.

(d) Instructions using indexed addressing have a full stop then the index register. If the instruction is indirect indexed, then an I is also added before the index register, and if the instruction is zero page indexed, then a Z is also added before the index register. So LDA (absolute), LDA.X, LDA (indirect), is LDAI.Y and STA (zero page),X is STAZ.X.

(e) With jumps and branches, the operand is the line number to which the jump or branch goes, with one exception: with indirect jump (JMPI), the operand is the address used. A D S has two extra instructions, JMPOUT and JSROUT, with which you specify an address and not a line number to which the JMP or JSR goes. This is useful for calling ROM routines. A D S also has two special instructions, *BYTE and *WORD. These create in memory the value specified in the operand, so *BYTE 255 puts 255 in the next memory location and *WORD 65535 puts 65535 in LSB,MSB format in the next two memory locations.

More details next week.

```
1 GRAPHICS 0
5 POSITION 17,0:? "A.D.S.":POSITION 0,10:? "Max.number of lines";:INPUT MNLI
                                                    ":POSITION 0,10:? "Ma
6 POSITION 0,10:? "
x.number of labels";:INPUT MNLB
                                                    "
7 POSITION 0,10:? "
9 POSITION 13,10:? " PLEASE WAIT";
10 DIM LA$(6),IN$(1541),BY(256),S$(6):S$="------":DIM OP$(6),APR$(MNLI*6+5),APLN
$(MNLI*6+5),IAO$(1),ST$(6),EN$(6)
15 DIM H$(1),A$(6),B$(6),C$(1),HEX$(6),DES$(6),LI$(6),MST$(6),MEN$(6)
18 DIM CMD$(6),O$(6),MEMPO(MNLI),AO$(MNLI*6+5),AOD$(MNLB*6+5):DIM AODV$(MNLB*6+5
):DIM T$(6):T$="      ":DIM LT(MNLB)
19 OPEN #1,4,0,"K:":DIM INKEY$(1):RESTORE 10000:MAINMENU=54:ASSMENU=515:DISMENU=
61
20 FOR N=1 TO 256
30 READ OP$,M:IF LEN(OP$)<6 THEN OP$(LEN(OP$)+1,6)=S$(1,6-LEN(OP$))
40 IN$(N*6,N*6+5)=OP$:BY(N)=M
50 NEXT N
54 TRAP 2010
55 ? ")Press:":? :? " 1 for assembler,":? " 2 for disassembler."
56 GET #1,C:INKEY$=CHR$(C)
57 IF INKEY$="1" THEN ? :? "Assembler selected.":GOTO 515
58 IF INKEY$="2" THEN GOTO 60
59 GOTO 55
60 ? :? "Disassembler selected."
61 TRAP 2000:? :? "Press:":? :? " 1 to list to screen,":? " 2 to list to assembl
er,":? " 3 to return to main menu."
62 GET #1,C:INKEY$=CHR$(C)
64 IF INKEY$="1" THEN ASL=0:MST$=ST$:MEN$=EN$:MST=STADDR:MEN=ADDR:GOTO 68
65 IF INKEY$="2" THEN ASL=1:DP=1:AFLG=0:NAO=0:MST$=ST$:MEN$=EN$:MST=STADDR:MEN=A
DDR:GOTO 68
66 IF INKEY$="3" THEN ST$=MST$:EN$=MEN$:STADDR=MST:ADDR=MEN:GOTO 55
67 GOTO 62
68 ? :? "Start address";:INPUT ST$:? :? "End address";:INPUT EN$:?
```


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```
69 C$=ST$(1,1):IF C$="$" THEN HEX$=ST$:GOSUB 7000:STADDR=V:HEX=1:GOTO 71
70 STADDR=VAL(ST$):HEX=0
71 C$=EN$(1,1):IF C$="$" THEN HEX$=EN$:GOSUB 7000:ENADDR=V:GOTO 73
72 ENADDR=VAL(EN$)
73 ADDR=STADDR:A=0
80 INO=PEEK(ADDR)
84 IF PEEK(764)=28 THEN POKE 764,255:GOTO 61
86 IF ASL=1 AND DP=MNLI THEN GOTO 130
87 IF ASL=1 THEN MEMPO(DP)=ADDR
88 IF HEX=1 THEN DEC=ADDR:GOSUB 8000:? HEX$;:GOTO 90
89 ? ADDR;" ";
90 IF HEX=1 AND ASL=1 THEN APLN$(DP*6,DP*6+5)=HEX$:GOTO 98
91 IF ASL=1 THEN APLN$(DP*6,DP*6+5)="      ":APLN$(DP*6,DP*6+5)=STR$(ADDR)
98 IF BY(INO+1)=0 THEN V=-1:ADDR=ADDR+1:GOTO 140
99 IF BY(INO+1)=1 THEN V=PEEK(ADDR+1):ADDR=ADDR+2:GOTO 140
100 IF BY(INO+1)=2 THEN V=PEEK(ADDR+1)+PEEK(ADDR+2)*256:ADDR=ADDR+3:GOTO 140
102 BV=PEEK(ADDR+1)
110 IF BV<128 THEN V=ADDR+BV+2:ADDR=ADDR+2:GOTO 140
120 V=ADDR+2-(128-(BV-128)):ADDR=ADDR+2:GOTO 140
130 ? :? "No more room for Program.":APR$(DP*6,DP*6+5)="*END__":AO$(DP*6,DP*6+5)
="      "
135 APLN$(DP*6,DP*6+5)="NRP   ":GOTO 515
140 ? IN$((INO+1)*6,(INO+1)*6+5);" ";:IF ASL=1 THEN AO$(DP*6,DP*6+5)="      "
141 IF V=-1 AND ASL=0 THEN ? :GOTO 149
142 IF V=-1 AND ASL=1 THEN AO$(DP*6,DP*6+5)="      ":? :GOTO 147
143 IF HEX=1 THEN DEC=V:GOSUB 8000:? HEX$:GOTO 145
144 ? V
145 IF HEX=1 AND ASL=1 THEN AO$(DP*6,DP*6+5)=HEX$:GOTO 147
146 IF ASL=1 THEN AO$(DP*6,DP*6+5)=STR$(V)
147 IF ASL=1 THEN APR$(DP*6,DP*6+5)=IN$((INO+1)*6,(INO+1)*6+5)
148 IF ADDR>ENADDR+1 AND ASL=1 THEN APR$(DP*6,DP*6+5)="*END__":AO$(DP*6,DP*6+5)=
"      ":GOTO 515
149 IF ADDR>ENADDR AND ASL=0 THEN GOTO 61
150 IF ASL=1 AND DP=MNLI THEN 130
151 IF ASL=1 THEN DP=DP+1
153 GOTO 80
200 DP=1:AFLG=0:NAO=0
215 ROW=PEEK(84):IF ROW=23 THEN ? :POSITION 2,22
220 ROW=PEEK(84):INPUT LI$:POSITION 9,ROW
221 IF LEN(LI$)<6 THEN FOR N=LEN(LI$)+1 TO 6:LI$(N)=" ":NEXT N
225 APLN$(DP*6,DP*6+5)=LI$:COL=PEEK(85)+PEEK(86)*256:ROW=PEEK(84):INPUT CMD$
230 IF LEN(CMD$)<6 THEN CMD$(LEN(CMD$)+1,6)=S$(1,6-LEN(CMD$))
240 APR$(DP*6,DP*6+5)=CMD$
245 IF CMD$="*END__" THEN AO$(DP*6,DP*6+5)="      ":GOTO 515
250 POSITION COL+7,ROW:INPUT O$:IF LEN(O$)<6 AND O$<>"" THEN FOR N=LEN(O$)+1 TO
6:O$(N)=" ":NEXT N
252 IF O$<>"" THEN AO$(DP*6,DP*6+5)=O$
255 IF O$="" THEN AO$(DP*6,DP*6+5)="      "
260 DP=DP+1:IF DP<MNLI THEN 215
270 ? "No more room for Program.":CMD$="*END__":APLN$(DP*6,DP*6+5)="NRP   ":GOTO
 240
300 IF DP=0 THEN ? "Program not yet written.":GOTO 515
301 ? :? "Start address";:INPUT ST$:C$=ST$(1,1):IF C$="$" THEN HEX$=ST$:GOSUB 70
00:STADDR=V:GOTO 305
302 STADDR=VAL(ST$)
305 LPASS=0:LPFLG=0
310 IDP=1:ADDR=STADDR:PASS=0:PFLG=0:LPASS=0:LPFLG=0:AFLG=0
315 ? :? " Pass 1:main Program.":?
320 IF LPFLG=1 THEN RETURN
321 MEMPO(IDP)=ADDR
330 CMD$=APR$(IDP*6,IDP*6+5):IF CMD$="*END__" THEN 500
331 IAO$=AO$(IDP*6,IDP*6)
332 IF IAO$="$" THEN HEX$=AO$(IDP*6,IDP*6+5):GOSUB 7000
335 IF CMD$="JMPOUT" THEN GOSUB 492:GOSUB 495:GOTO 320
336 IF CMD$="JSROUT" THEN GOSUB 492:GOSUB 497:GOTO 320
337 IF CMD$="*BYTE_" THEN GOSUB 492:POKE ADDR,V:ADDR=ADDR+1:GOSUB 491:IDP=IDP+1:
GOTO 320
338 IF CMD$="*WORD_" THEN GOSUB 492:POKE ADDR,V-256*INT(V/256):POKE ADDR+1,INT(V
/256):ADDR=ADDR+2:GOSUB 499:IDP=IDP+1:GOTO 320
340 FOR SN=6 TO 96 STEP 6
345 FOR S=SN TO SN+1506 STEP 24:IF IN$(S,S+5)=CMD$ THEN 360
350 NEXT S
352 NEXT SN
355 ? "Unknown command in line ";APLN$(IDP*6,IDP*6+5):GOTO 515
360 CMD=S/6-1
365 ? APLN$(IDP*6,IDP*6+5);" ";APR$(IDP*6,IDP*6+5);" ";:IF BY(CMD+1)=0 THEN ? :G
OTO 370
367 ? AO$(IDP*6,IDP*6+5)
370 POKE ADDR,CMD
380 IF CMD$="JMP___" OR CMD$="JSR___" OR BY(CMD+1)=3 THEN GOSUB 420:IDP=IDP+1:GO
TO 320
385 GOSUB 492
390 IF BY(CMD+1)=0 THEN ADDR=ADDR+1:IDP=IDP+1:GOTO 320
400 IF BY(CMD+1)=1 THEN POKE ADDR+1,V:ADDR=ADDR+2:IDP=IDP+1:GOTO 320
410 POKE ADDR+1,V-256*INT(V/256):POKE ADDR+2,INT(V/256):ADDR=ADDR+3:IDP=IDP+1:GO
TO 320
420 DES$=AO$(IDP*6,IDP*6+5)
430 FOR N=6 TO DP*6:IF APLN$(N,N+5)=DES$ THEN GOTO 446
440 NEXT N
445 ? "Jump to non-existent line in line ";APLN$(IDP*6,IDP*6+5):GOTO 515
446 N=N/6
447 IF N>IDP AND PFLG=0 THEN PASS=1:GOSUB 480:RETURN
450 IF CMD$="JMP___" THEN POKE ADDR+1,MEMPO(N)-256*INT(MEMPO(N)/256):POKE ADDR+2
,INT(MEMPO(N)/256):ADDR=ADDR+3:RETURN
455 IF CMD$="JSR___" THEN POKE ADDR+1,MEMPO(N)-256*INT(MEMPO(N)/256):POKE ADDR+2
,INT(MEMPO(N)/256):ADDR=ADDR+3:RETURN
```

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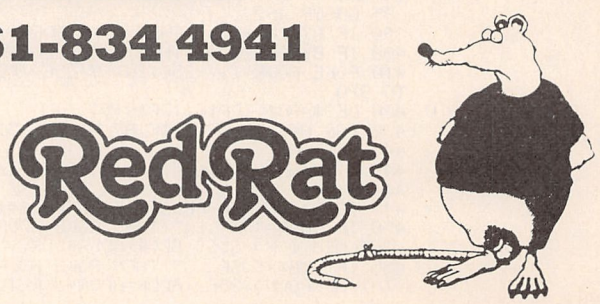


XPoke

Alan Crawford

One of the problems of accessing the extra bank of 64K of Ram on the 130XE, is that you must switch in the correct bank and then remember that it can only be accessed in the 16–32K area.

This routine simplifies that by providing USR functions that allow you to access the banked memory as though it were a continuous block of 64K. The syntax is A=URS(XPOKE, ADDRESS, NO.) where *A* is a dummy variable. To peek use A=USR(XPEEK, ADDRESS) to return the value in *A*.

```
50 FOR L=1536 TO 1628:READ D:POKE L,D:NEXT L
60 XPOKE=1536:XPEEK=1551
70 STOP
200 DATA 104,201,2,208,27,32,41,6,104,104,145,203,76,84,6,
104
210 DATA 201,1,208,12,32,41,6,177,203,133,212,132,213,76,
84,6
220 DATA 170,240,5,104,104,202,208,251,96,104,170,104,168,
173,1,211
230 DATA 41,227,141,1,211,104,72,41,192,74,74,74,74,13,1,
211
240 DATA 141,1,211,104,41,63,9,64,133,204,104,133,203,152,
72,138
250 DATA 72,160,0,96,173,1,211,9,16,141,1,211,96
```

Stealer

Simon Sleightholm

Steal your favourite sprite designs with this C128 routine. Simply lead up the target game, and start it: Then press the reset button and load this program. You can then cycle through 255 of the possible start locations for sprites used in the game.

```
 1 REM SPRITE STEALER
 2 REM BY SIMON SLEIGHTHOLM
 3 REM 1986
 4 REM STICK UP/DOWN-INCREASE/DECREASE SPRITE START LOCATIONS
 5 REM STICK LEFT/RIGHT-SELECT NORMAL OR MULTICOLOUR SPRITES
 6 REM FIRE BUTTON-CHANGE SPRITE COLOUR
 10 CO=0:C=1
 20 PRINT"□"
 30 INPUT"MULTICOLOUR 1";M1
 40 INPUT"MULTICOLOUR 2";M2
 50 SPRCOLORM1,M2
 60 F$="PLAIN"
 70 SPRITE1,1,1,1,1,1,0:MOVSPR1,270,100
 80 IFJOY(2)=3THENCO=1:F$="MULTI"
 90 IFJOY(2)=7THENCO=0:F$="PLAIN"
 100 IFJOY(2)=1THENX=X+1
 110 IFJOY(2)=128THENC=C+1:IFC=17THENC=1
 120 IFJOY(2)=5THENX=X-1
 130 IFX>255THENX=0
 140 IFX<0THENX=255
 150 PRINT"■■■■■■■■■START ADDRESS";X*64;"■■   ";":";X;"■■      "
 160 PRINT"■■■■■■■■■■";F$;"      "
 170 POKE2040,X
 180 SPRITE1,1,C,1,1,1,CO
 190 GOTO80
```

Graphic Text

Darryn Lavery

Place text at the graphic cursor with this ST listing. To do this enter A$="text": X= x co-ord : Y= y co-ord : GOSUB TEXT.

```
10    REM GRAPHIC TEXT BY DARRYN LAVERY
20    A$="PRINT TEXT ANYWHERE USING NORMAL CO-ORDS":Y=50
30    FULLW 2:CLEARW 2
40    FOR X=100 TO 120 STEP 2:GOSUB TEXT:Y=Y+10:NEXT
50    X=INP(2)
60    END
1000  TEXT:POKE CONTRL,8:POKE CONTRL+2,1:POKE CONTRL+6,LEN(A$)
1010  FOR Z=1 TO LEN(A$)
1020  Z$=MID$(A$,Z,1):POKE INTIN +(2*Z)-2,ASC(Z$)
1030  NEXT
1040  Z=LEN(A$)=1:POKE INTIN+(2*Z)-2,0:POKE PTSIN,X:POKE PTSIN+2,Y
1050  VDISYS(1):RETURN
```

Attention!

Unfortunately due to the sheer volume of submissions our returns department has been unable to cope satisfactorily. So, from now on we are requesting that you include a suitable stamped addressed envelope for return of your submission. Not enclosing a suitable SAE will mean that your program will not be returned. You have been warned.

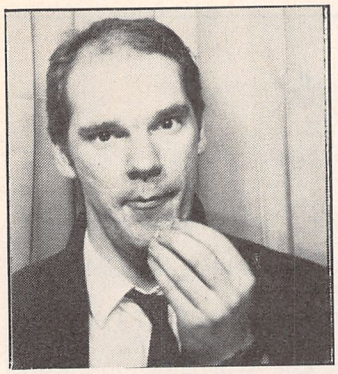
The beneficial side of this system is that 90% of submissions will be returned within one week. A small price to pay for such a service I'm sure you'll agree.

With regards to future submissions we are looking for articles on programming in general, utility programs and applications software and lastly, good games. Here are a few types of program we don't want: Educational, hangman, pools predictors, mastermind, flashing borders, bank accounts, disc catalogues and clocks.

If you can't get a program listing in the magazine to work ring in to see whether it was faulty rather than writing. If there were problems then we'd let you know. Corrections normally appear a couple of weeks later. Thanks.

Duncan Evans
Technical Editor

PEEK & POKE



with Kenn Garroch

No effect on the printer

Christopher Adams, of Moseley, Birmingham, writes:

Q I recently bought a Memotech RS232 serial interface for my veteran ZX81. The idea was to link the computer with a Brother HR5 printer, but although the interface's Rom routines produce the expected screen displays, trying to transmit has no effect on the printer and frequently hangs up the computer.

The interface has to be initialised by defining a variable P$ with codes to set such things as parity, baud rate, stops bits, etc. A colleague, who works in telecomms, read both printer and interface manuals and suggested the formula P$="00010110,01101000". This gives 300 baud, even parity, one stop bit, 8-bit word-length, and a few other controls and commands. As far as I can tell, the printer is set up to cope with this arrangement, but still no joy.

One thing I've noticed is that the printer end connector is given in the manual as 3M Part No 3635, but the one supplied is 3634 – could this be the trouble?

A This sounds more like a connection problem than anything else. RS232s when used with printers usually need the following lines:

TX: Transmit from the computer to RX (receive) on the printer.

CTS: Clear to send on the computer to either RTS (request to send) or DTR (data terminal ready).

Signal Ground on the computer to signal ground on the printer.

If the CTS line is connected to the wrong line on the printer, the computer will sit around waiting for a signal that tells it the printer is ready to receive. This may be the case in your situation.

The thing to do is look in the interface's manual for a pin out of the connector. Check that TX and ground are connected correctly, and then check the CTS. If the HR5 has a 25 way D connector, then try CTS connected to pin 4 or pin 20 (RTS and DTR). If this doesn't work, try placing 5V on the CTS (interface end) so that the printer always appears ready.

It is possible that there are other connections that need setting (connecting to 0 or 5V) so that the interface recognises the printer. You will have to look in the manual and find which are inputs, and then experiment.

One way of checking whether the interface is operating correctly is to use a null modem (I think it's called this). This gadget simply feeds RX to TX, RTS to CTS. Transmitting via the interface simply sends the data back, proving that it is in working order. With the correct plug, it is easily possible to make one of these.

Making waves on the ST

Tom Evans of London W11, writes:

Q I was wondering, if you had the correct software and microphone, would it be possible to use a computer as an oscilloscope, creating waveforms in the same style as viewed on a purpose-built CRO? I own an Atari ST.

A The answer is yes, to a certain extent. There are certain disadvantages, and certain advantages to using a computer in this way.

The hardware necessary is an Analogue to Digital Converter (ADC), and some interface circuitry, plus an amplifier for the microphone signal. An ADC is a gadget that takes variable voltage signals, and converts them into digital numbers, generally four, six, eight or 12 bit ones depending on the accuracy needed.

Inside an ADC are a set of comparators each with two inputs. When one input has a higher voltage that the other input, the output of the comparator goes high, ie, gives a 1. In a fast ADC, there are a lot of comparators, each with a successively higher standard voltage connected to one of its inputs. The other input goes to the incoming voltage.

As the incoming voltage changes, the number of comparators that are on changes. The number that are on are decoded to give a binary number representing the analogue input voltage. The problem is that to convert a voltage into an 8-bit number (256 values), 256 comparators are needed which is a lot to fit on one chip.

The way around this is to use one comparator and change the standard voltage at a set rate, ie, scan it through all possible values. As long as this scan is performed faster than the incoming voltage is changing, a fairly accurate conversion can be performed. The main differences between the two is that the first is fast, but expensive, the second slow and cheap.

Which kind is used depends on the maximum frequency of the analogue signal. There are some ADCs that use a mixture of both methods to achieve reasonable speed at a reasonable price.

Since it takes a certain amount of time for the conversion to be done, the analogue signal is split up into a series of numbers at a set rate. Each of the conversions is known as a sample as it represents the value of the analogue voltage at a certain time. If the incoming voltage changes faster than the samples can be taken, the resulting series of numbers do not represent the analogue signal accurately, and in extreme cases are complete gibberish.

The rule is that the sample frequency (samples per sec) should be at least twice the frequency of the incoming signal to get any reasonable representation. In fact, it is better to go for three to four times.

The disadvantage of a computer used as a CRO (Cathode Ray Oscilloscope) is that its bandwidth is limited by the speed of the ADC,m and by the speed that it can read the data coming from it.

Audio signals usually lie in the frequency range 20–20000Hz (1Hz is 1 cycle per sec) so the sampling frequency needs to be at least 40000Hz which means that the ADC should have a conversion time of 25µ seconds or even better 12.5µ seconds to give 80KHz.

Fortunately Maplin stocks the ADC0820CCN which boasts a conversion time of 1·5µs for 8 bits, which should allow frequencies of up to 300KHz to be sampled. This ADC is also quite easy to attach to a computer since it has an 8 bit data bus that can be directly connected to a parallel computer port.

Tied up with ribbons

S Hazelgrove, of Leeds, Yorkshire, writes:

Q A problem has developed with the ribbons on my printer, a five year old Star BP510. When the ribbon reaches the end of its travel, an eyelet toggles a switch and the ribbon reverses direction.

The problem is that the ribbon does not reverse straight away. It stands still for eight or nine passes of the print head. The result is that each end of the ribbon wears very quickly compared to the rest. Is there any way to overcome the problem?

A I presume that the printer did not always do this, so the fault must be to do with either a mechanical fault or muck. The latter seems most likely since the ribbon reverses eventually.

Try examining the mechanics of the process a little more closely and see if there are any points that need oiling or cleaning. Printers pick up quite a lot of dust over the years and they need a good clean every now and again.

Apart from this, I don't know what to suggest, perhaps some other readers have had this problem and overcome it? If so, write to Peek and Poke and I will print your suggestions.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Kenn Garroch and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, 12-13 Little Newport Street, London WC2H 7PP.

Constant interruption

Gerry Holmes, of Gwent, writes:

Q I own an Atari ST. Could you tell me how to make, or the principle of, interrupt driven music? Also, how I could design my own font from assembly language?

A Interrupt driven music is simply a program that plays the sound chip using a predefined music score, and gets its timing from an interrupt. Since music nearly always has a set tempo, a regular beat must be maintained. The most regular beat, easily available, on the ST is the Vertical Blank Interrupt (VBI).

The music program is jumped to every time a VBI occurs, and picks up the next notes to be played. These are sent to the sound chip, the interrupt ends, and the main program is carried on.

The ST's VBI routine is quite important to the machine, since it performs such things as checking on the screen resolution, updating the colour palette, and keeping track of the discs, etc. Because of all of these functions, it cannot be simply redirected to run a music program. Instead, the music routine has to placed in the queue along with the other functions.

The queue holds the start addresses of all the current VBI routines, with a zero address meaning none. To insert a new routine, an empty space (zero address) in the queue must be found, and the music program address inserted.

Normally, there is space in the queue for eight addresses, not all of which are normally used. If they are, things get a little complicated but don't worry about this, there is generally a space left on the standard machine.

The following program inserts the address of the music routine into the queue using the setvbl subroutine, music is the interrupt routine that drives the sound chip. I have given a simplified version of a music routine, which goes blip . . blip . . blip. You will need to establish some kind of protocol in the data so that not all of the registers (envelopes, etc) need be loaded every time. To turn off the interrupt use *rstvbl*.

A couple of things to note are that, when in an interrupt routine, the ST is in supervisor mode automatically, and the sound chip can be addressed directly. The other thing is that the BIOS Trap commands don't work very well from within interrupt routines, so the sound chip has to be accessed directly. This is done from the two addresses $FF8800, which is the register select/register read location, and $FF8802 which is register write.

The sound chip has 16 internal registers which, unfortunately, have to be accessed by the roundabout method of sending the reg num to $FF8800 and then the data for that register to $FF88002. Since some I/O is attached to the sound chip, the mixer should be accessed to the way shown in the program, ie, read it, set or reset the bits you need, and then write it back. This gets around any disc problems that might occur.

Designing fonts on the ST is quite a complex business, and to explain it would take up a lot of space. The best thing to do is obtain the book *The Anatomy of the Atari ST* from First Publishing, 20B Horseshoe Park, Horseshoe Road, Pangbourne, Berks.

Have a look at the A-line 8 call, which should give you some idea. In the meantime, I'll give the subject some thought and see if I can represent it in a simpler fashion at a later date. Sorry I can't be more helpful at the moment.

Music demo program.

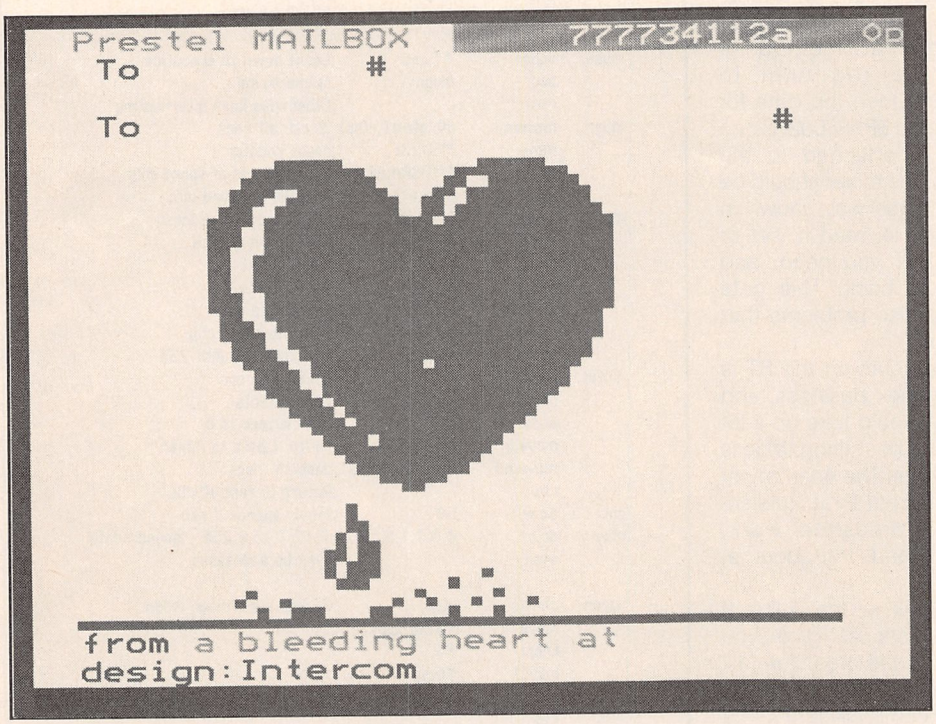
```
START   MOVE.L    A7,A5          Stadard header code
        MOVE.L    #USTK,A7       Set up local stack
        MOVE.L    4(A5),A5       Base page address
        MOVE.L    $C(A5),D0
        ADD.L     $14(A5),D0
        ADD.L     $14(A5),D0
        ADD.L     #$100,D0       Skip base page
        MOVE.L    D0,-(SP)
        MOVE.L    A5,-(SP)
        MOVE.W    D0,-(SP)
        MOVE.W    #$4A,-(SP)
        TRAP      #1
        ADD.L     #12,SP
        move.l    a7,errsve      Save stack pointer for accidents
        BSR       GO             Go main program
error   move.l    errsve,a7
        MOVE.L    #0,-(SP)
        TRAP      #1             Back to GEM Desktop
errsve  ds.l      1

GO      bsr       setvbl
        bsr       wkey
        bsr       rstvbl
        rts

setvbl  bsr       super          ;Need super mode for $456
        move.l    $456,a0        ;Address of VBL queue in $456
        moveq     #8,d0          ;Counter for 8 addresses
setvlp  tst.l     (a0)+          ;Check for zero entry
        beq       setvfd         ;Jump out when found
        subq      #1,d0          ;decrement couter
        bne       setvlp         ;try next
        bra       error          ;Can't find any!
setvfd  move.l    a0,vbqp        ;Save the queue pointer+4
        move.l    #music,-(a0)   ;Insert new address
        subq.l    #4,vbqp        ;correct address
        bsr       usuper         ;out of super mode
        rts                      ;done

vbqp    ds.l      1              ;Vertical blank queue pointer
rstvbl  bsr       super          ;Again need super
        move.l    vbqp,a0        ;Get address where music insert is
        move.l    #0,(a0)        ;Zero it to turn it off
        bsr       usuper         ;User mode
        rts                      ;Interrupt off

music   subq      #1,cnt         ;Count down to execution
        beq       mugo           ;Queue sound
        rts                      ;Otherwise keep interrupting
mugo    movem.l   d0/a0-a1,-(sp) ;Stash all regs
        move      #50,cnt        ;reset counter
        lea.l     $ff8800,a0     ;base address of sound chip
        lea.l     play,a1        ;address of sound info
munxt   move.b    (a1)+,d0       ;Get sound chip address
        cmp.b     #255,d0        ;255 is end of data
        beq       mufin          ;If so then end
        move.b    d0,(a0)        ;Set address
        move.b    (a1)+,d0       ;Sound chip data
        move.b    d0,2(a0)       ;Write to sound chip
        bra       munxt          ;And continue until 255
mufin   move.b    #7,(a0)        ;Mixer address
        move.b    (a0),d0        ;Get contents
        and.b     #254,d0        ;Set bit zero to 0
        move.b    d0,2(a0)       ;Write it back to mixer
        movem.l   (sp)+,d0/a0-a1 ;Unstash regs
        rts                      ;Return to rest of VBL
cnt     dc.w      50             ;Timer approx 1 sec
play    dc.b      0,0,1,1,8,16,11,0,12,7,13,0,255  ;sound data
        even                     ;Even up addresses

super   clr.l     -(sp)          ;Go into supervisor mode
        move      #$20,-(sp)
        trap      #1
        addq.l    #6,sp
        move.l    d0,stksve
        rts
stksve  ds.l      1
usuper  move.l    stksve,-(sp)   ;Go into user mode
        move      #$20,-(sp)
        trap      #1
        addq.l    #6,sp
        rts
wkey    move      #$FF,-(sp)     ;Wait for a keypress
        move      #6,-(sp)
        trap      #1
        addq.l    #4,sp
        beq       wkey
        rts
        DS.L      256
USTK    DS.L      1              User stack of 256 longs
        EVEN
        END
```

Return to sender? Address unknown?

Fed up with being told it's 'in the post'? Want a quick word with someone who's busy on their modem? David Wallin describes the various types of mailbox available on Prestel.

Everyone on Prestel knows that page 77 is a standard blank page; in fact, there are three types of this page available. There is the greeting type which is basically an electronic greeting card, with room for just the recipients mailbox number and your signature (occasionally there is also a blank line or two for a short message as well).

The second type is a standard page. These are basically 'blank forms' which can be filled in and sent to another Prestel user.



(Such as "I rang you at . . . and you were out").

There are many standard pages which is fine if you know where to find them, but often, sending a short 77 would be quicker.

The massive list of standard pages can be reached from the mailbox index on page seven.

Then there is the blank page. There aren't many of these since they include very little. There are a couple of lines of header on most with room for a message. One or two have patterns around the text and there are some with flower/animal motifs on them. One point to note when sending a mailbox is the line end. Some pages require a # at the end of a line and others don't. It's essential to ensure that if #es is needed or they are inserted, and if not they are it is omitted.

With most mailbox numbers, when you enter the recipient's mailbox number, their name is echoed back for you to check. A newish mailbox frame for longer messages does not include this and therefore it is vital to check that you have the mailbox number correct.

Finally, there is one interesting point I've discovered while looking around the Prestel system. Most areas have a talk-back section. This can be one of two things. Either a *Response Frame* or a mailbox page. The response frame does not need a mailbox number to be inserted and when sent goes to the correct person.

Designer mailbox

However, probably to save money, many sections use a specially designed mailbox page with the recipient's (ie, the editor of the area of Prestel) mailbox number already inserted. You just press # to 'agree' that the number is correct. You can however overtype this and insert someone else's mailbox number. Sneaky perhaps, but it's by no means illegal and your friends won't half get a shock when a mailbox with the words MICROMOUSE across the top arrives!

Some of the more common 'blank' mailbox pages

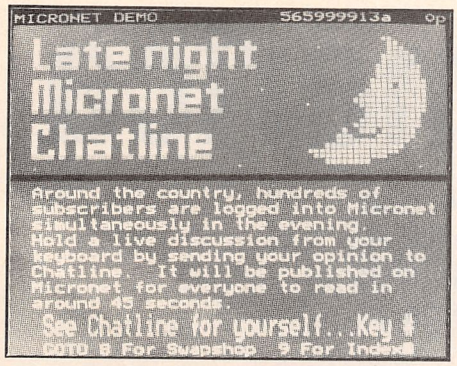
Blank	77
Mailbox	84, 82
Address	89
Oi	7774024
Memo	78
Micromouse	77748571
Long	83
Special	74
Advert	71
Pride	7777672
GugBox	77743701
Patterns	72, 68
Titled	78
Letter	79
Filebox	85
Invisible	86
Bizznet	77748581
Double	73

Invisible page

The invisible page is an odd one, and you will only be able to view its contents if your software has a 'reveal' facility. Do not send an invisible message to someone without checking to find out if they have a reveal facility on their software. If they haven't, you've sent a message secret even to the recipient!

Colour and graphics on Prestel mailboxes are nice, but the messages have to be incredibly short.

"Do not send an invisible message . . . without checking . . . they have a reveal facility. Or you've sent a message secret even to the recipient"



I had used Telecom Gold for about six months before I joined Micronet and, being used to Gold's facilities, the messaging on Prestel came as quite a let down.

This is due to the restrictions of the Viewdata screen. However, Prestel have recently installed a similar system to theirs abroad, but it has most of the mailbox 'problems' sorted out.

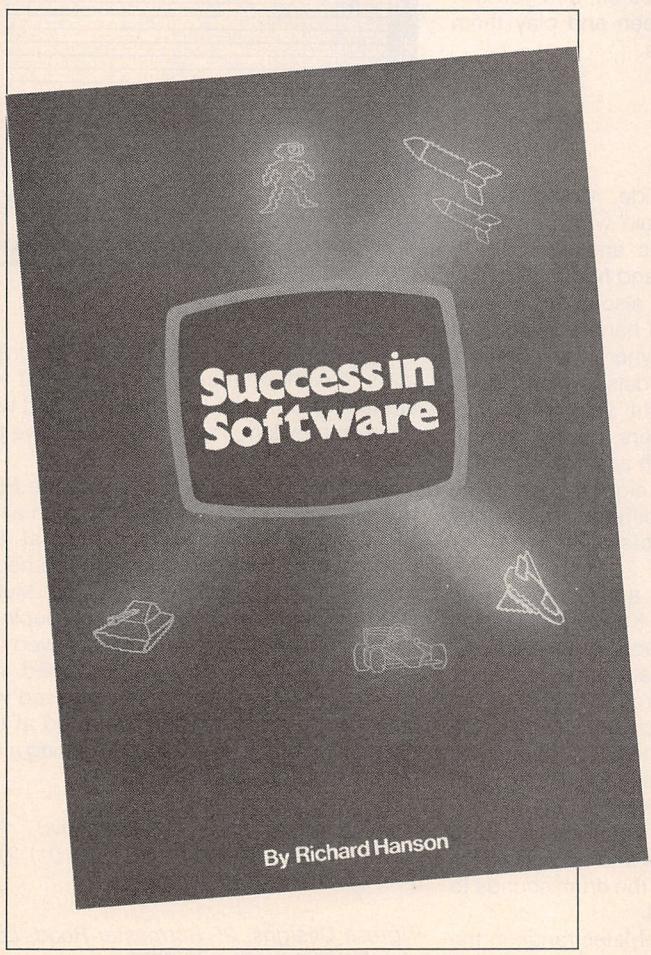
Auto reply

Once the system has been fully tested abroad and is bug-free, it will be brought over here to replace the current system. So in the future we should see a greatly improved mailbox system on Prestel. Things like longer messages and auto-reply will be available — things that Telecom Gold already has.

You may wonder why the two should be any different. Both are run by BT, but were originally designed for different purposes, Prestel as an information service and Gold a mailbox one. Both have now spread into each other's territory.

Prestel offers mailbox and Gold (Micro-link) has teleshopping, telebooking, news and other 'information' areas. I advise a mailbox on each system to get the best of both worlds.

For a free brochure on joining Gold with the registration fee waived mailbox me on 819991214 or write to me at *Popular Computing Weekly*, 12–13 Little Newport Street, London WC2H 7PP.



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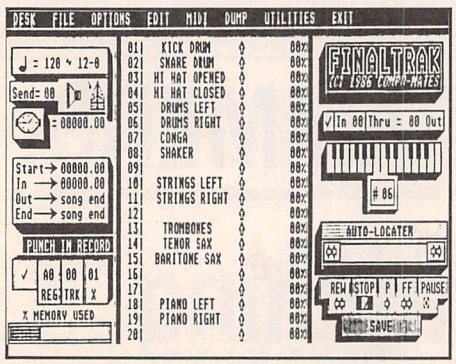
Sounds of America

Mark Jenkins finds that much of the new music software is coming from the USA. However, while we wait for a UK distribution agreement, it's possible to obtain the packages from the companies direct.

The USA continues to turn out music software faster than UK importers can take it on, and there are still many US companies manufacturing exciting-looking packages which have little or no exposure over here.

One such is Compu-Mates, which will hopefully follow in the footsteps of Sonus and start up a UK operation before long. In the meantime, it's easy enough to contact the company in the US, and they'll be happy to send you a catalogue which contains quite a few products unobtainable elsewhere.

For example, the DW8000 *Synthdroid* is one of the few available editors for the Korg DW8000/EX8000, and in the case of the latter unit, the keyboardless expander version of this powerful analogue synth, it could be invaluable.



Synthdroid

Synthdroid uses several windows to display the synth's filter envelope, amplifier envelope, and delay line parameters, and fits most of the other parameters on a single page. Touch sensitivity parameters are also included, and you can fit 20,132 patches on a double-sided, double density disc.

It's claimed that the delay editor page allows you to create effects not otherwise available on the synth itself, which is unusual, while the joystick can be used to give a variable amount of sustain.

There's a similar package for the Kawai K3 synth called *K3P0+* which stores 17,800 patches or 5,800 user waveforms on a disc, and a Casio CZ editor with 'artificial intelligence' patch creation facilities. For the more upmarket user there are editors for the Oberheim Matrix 6 and Matrix 6R module, and the Kawai K5 (which isn't available yet in the UK) already has a Compu-Mates editor.

Also on the upmarket side, Compu-Mates has a Korg DSS-1 editor which will handle the keyboard's synth and sample parameters as well as additive synthesis routines. Again, several artificial intelligence routines are included to help in the creation of new sounds.

On the sequencer side, Compu-Mates offers *Final Trak,* which has up to 128 tracks, Midi filtering, cut and paste facilities, system exclusive patch dump routines and much more. Editing facilities are apparently highly advanced – you can remove notes played by the right hand without touching notes play by the left hand, for instance – and there's a tunable metronome which can be sent out over a Midi channel, switchable Midi Out/Thru, and an option of using the *Final Score* transcription package.

Final Score will display any sequence in conventional musical notation, offering different musical font styles, cut and paste, alternative colours and so on, and you can enter notes on the screen and play them back as Midi sequences.

Brain into gear

On the hardware side, Compu-Mates offer the Midi Patch Brain which switches from eight to 16 inputs and eight to 16 outputs, syncs to tape and had an optional remote control. There's also going to be a SMPTE Brain which will handle all sorts of time codes and tape sync as well, plus a package called GenPedals, which allows you to use up to eight volume pedals, modulation wheels, faders, breath controllers or other inputs, each assignable to any Midi parameter in up to eight setups which can be arranged in 50 different sequences accessible through a footswitch. Handy for live performances!

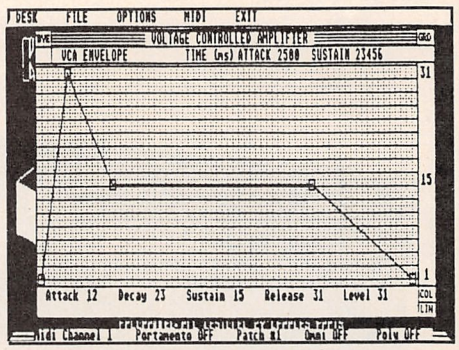
On to drum machines, and Compu-Mates has a DrumDroid for the Kawai R100, which is reputedly a very good-value machine, and velocity, level, pan and tune can all be programmed and stored. All 24 drum sounds rather than a choice of eight are made accessible from the micro's keys and you can play the last sound at any pitch using the fourth row of keys on the micro.

Artificial intelligence routines are also included to generate fills and new patterns, and it's possible to map the drum sounds to a synth keyboard layout.

Prices for the Compu-Mates range in the US seem very reasonable, starting at £79.95 about £50–£55 for the DW8000 *Synthdroid* and going up to $199.95 (£130) for *Final Trak.* There's also a *Synthdroid* for the Akai S900 Sampler in the offing – that one should cost around $129.95 (£85–£90). Compu-Mates also offers a list of hardware updates and add-ons for the 8-bit XE and XL Ataris, although most of its software runs only on the ST.

While on the subject of the ST, Tigress Designs tells me that the colour verson of its very successful *Iconix* sequencer is now almost ready.

The original package was by far the most friendly I've seen to date for the ST, and Tigress has released an enhanced version which irons out a few bugs in the Midi clock and timing resolution areas.



Final Trak

Tigress is now looking for new programmers to work on music products, so if you are familiar with the ST, with Midi, and with development languages such as C, give the company a call.

Back to the world of 8-bits with the BBC B. Apparently there's some confusion as to the state of the add-ons market at the moment, so just to clarify; we published a review of the Hybrid Technology Music 5000 (the updated Music 500) a couple of months ago, but have not yet reviewed the Peartree Music 7000 (now renamed the Music 87) since it hasn't been released yet. However, it has been demonstrated at the *Acorn User* Show, and we'll be running a full review as soon as possible.

Compu-Mates, 8621 Wilshire Blvd, 177 Beverly Hills, CA 90211 USA, (0101) 213-271 7410.

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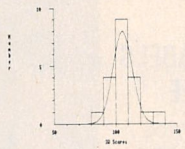

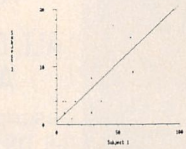

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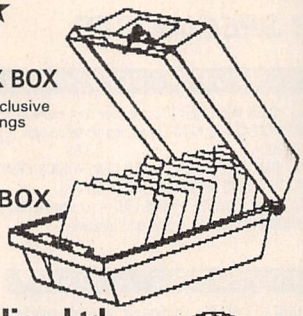

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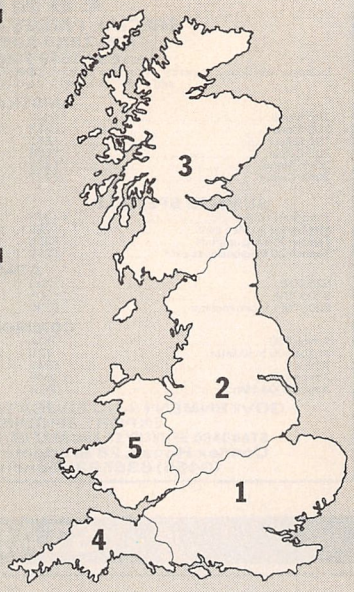

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Amstrad CPCs

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Program *Wizball* **Type** Arcade **Price** £8.95 tape, £14.95 disc **Supplier** Ocean, 6 Central Street, Manchester M2 5NS.

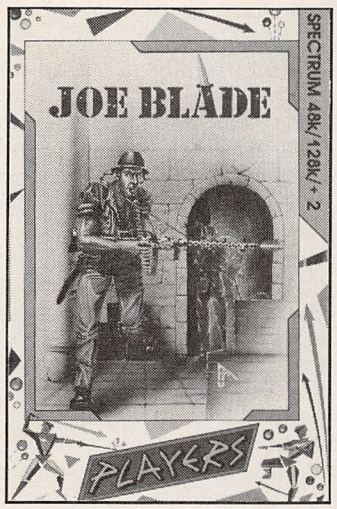
Program *Ten Pin Challenge* **Type** Bowling simulation **Price** £1.99 **Supplier** Atlantis Software, 28 Station Road, London SE25 5AG.

Program *Athena* **Type** Arcade **Price** £8.95 tape, £14.95 disc **Supplier** Imagine, 6 Central Street, Manchester M2 5NS.

See panel for comment.

Program *Joe Blade* **Type** Arcade **Price** £1.99 **Supplier** Players, Mercury House, Calleva Park, Aldermaston, Berks RG7 4QW.

See Spectrum for comment.



Atari XL/XE

Program *Survivors* **Type** Arcade **Price** £2.99 **Supplier** Atlantis Software, 28 Station Road, London SE25 5AG.

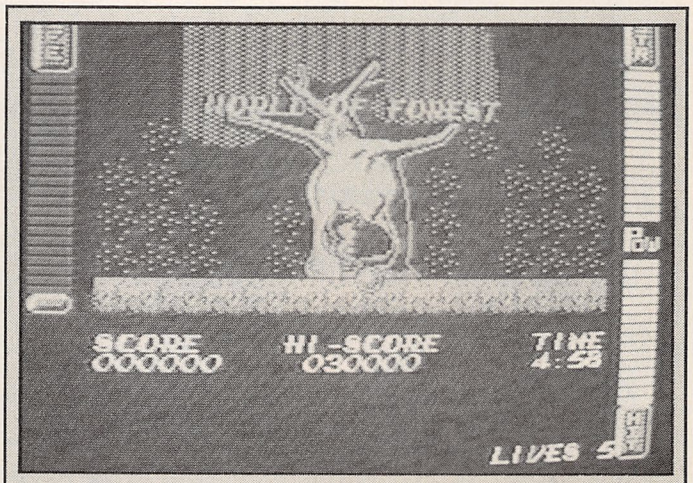
Program *Alternate Reality – The Dungeon* **Type** Role-playing game **Price** £19.99 **Supplier** US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.

Sequel to the original *Alternate Reality*, this one lets you take your Dungeons and Dragons type character into a subterranean dungeon filled with all sorts of monsters and treasures. One of the better computerised RPGs.

Atari ST

Program *Deathstrike* **Type** Arcade **Price** £14.95 **Supplier** Talent Computer Systems, Curran Building, 101 St James Road, Glasgow G4 0NS.

continued on page 43 ▶



Athena **is the latest coin-op conversion from Imagine and features the exploits of the mythological heroine as she attempts to seek out and overcome the three-headed bad guy (or bad-horse in this case) who lies in wait in the game's final screens.**

The game loads in several parts, each part representing a different level or world – forest, sea, sky, ice, fire, and hell. The cassette inlay tells you that Athena was the goddess of wisdom, and, faced with an unending stream of monsters as she fights her way through each world, Athena does what any wise person would do. She pounds them all into the ground.

You are unarmed at the start of the game, but as you move on you will come across a number of brick structures and smashing your way through these will reveal additional weapons as well as clearing your path. You'll also be able to find extra armour (which you will definitely need), and the occasional pair of wings to boost your manoeuvrability.

The graphics tend to look a little bit squashed at times, but it's not clear what some of the 'monsters' are supposed to be. The instructions mention witches and minotaurs, and these are clear enough but there's no mention of the little things that look like demented potatoes or the flying apples (fireballs?).

Control of Athena is the usual left/right, jump/duck and fire, which is simple enough, though Athena isn't as quick a mover as she could be. The various monsters come at you at such a rate that you need to be able to change direction and fire more quickly than the game allows.

It gets a bit frustrating at times when you're pumping away at the fire button and still facing the wrong direction. And at times the sheer number of monsters on the screen mean that you don't really stand a chance no matter how fast your reflexes are.

Still, there are some well thought-out details in the game; progress through each world isn't strictly linear, which means that you don't get bored going through the same fixed sequence all the time.

There are two possible exits from each world, one harder than the other, and (a hugely sensible idea) at the end of each game you get the option of continuing from where you left off.

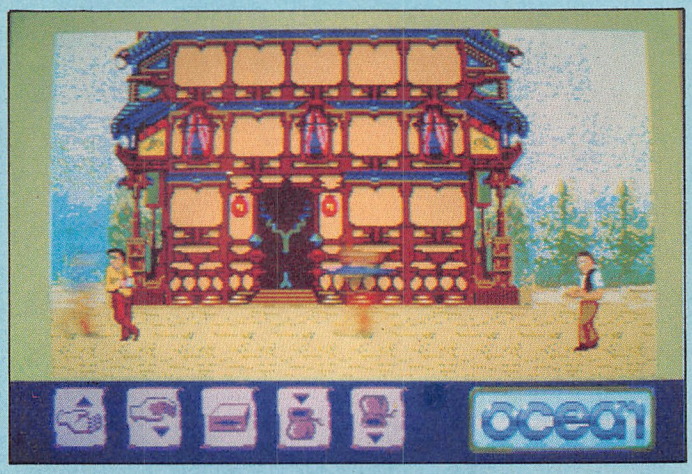
This eliminates the boredom of going over the early parts of the game over and over, though you're only allowed to do this three times.

All in all, *Athena* is a competent enough game though it isn't really action packed enough to be one of Imagine's best arcade conversions.

Cliff Joseph

Program *Athena* **Type** Arcade **Micro** Spectrum **Price** £7.95
Supplier Imagine Software, 6 Central Street, Manchester.

Life on the Eastern wave

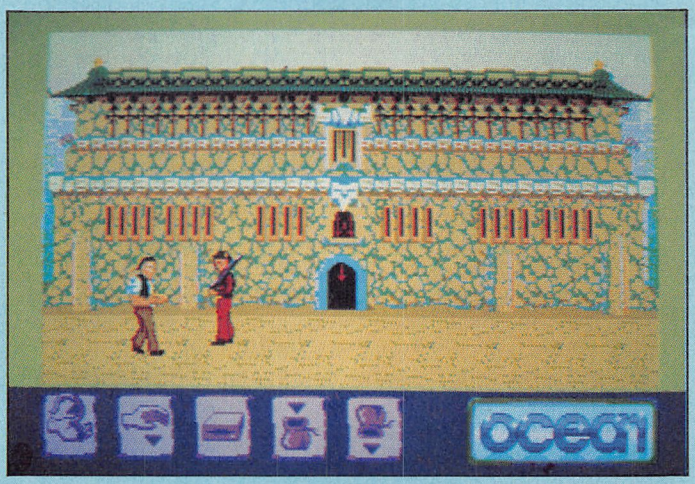


Trading has been the stable diet of computer strategy games since the days of the ZX81, so yet another such game is breaking no new ground. But wait, this is Ocean's *Tai-Pan,* a game launched somewhat prematurely in May, and only now becoming available, on the ST 'Real Soon' and on the Spectrum, which is supposed to be imminent.

The object in *Tai-Pan,* which is based on James Clavell's book of the same name, and set in China in the 1840's is of course, to get rich. But there's more to it than that. For one thing you must raise the finance for a ship and then pay it back within six months or risk losing your head.

That accomplished you must roam the seas, sticking to the trade routes, if you're of a cowardly nature, trading enough goods, and indulging in a spot of smuggling and piracy to speed things along. The idea is to make your fortune and raise yourself to the status of Tai-Pan (supreme leader). If that sounds like a watery *Elite* then, you're right, it is.

The first task to be done is to find the restaurant in Canton wherein, you'll be offered a meal. Refuse the meal; after all, you don't have any money to start with, and you are taken to a back room where you are given a loan of $300,000.



From there you can nip down to the bank to buy a ship, although you can only afford the cheapest two at the moment. Wander round to an inn to recruit people, or try press ganging them, then down to the warehouse for equipment and supplies.

Around the towns are other intriguing places like smugglers' conventions and gambling dens, even munitions factories.

When you're in a town, one of the faults in *Tai-Pan* becomes evident. The streets are laid out so that you move left to right, and when you want to move to another street you must find one of the interconnecting screens, and then push the joystick or mouse forwards.

Unfortunately some of the time there is no indication that you have actually gone anywhere if the next street has an interconnecting screen in the same place.

What is more confusing is when you leave one end of a street and it throws you straight into the interconnecting screen on the previous level, ie, you did not move back a level deliberately.

Compressed

All this is, in some ways due to the fact that the program was written in full before being compressed, a task which obviously proved difficult for the programmers. Another victim is the interiors of the buildings. There aren't any. All you get is a pattern representing that establishment.

However, once you've sorted your land-based duties out you can set off to make your fortune. Once at sea you must remember to feed your lads, otherwise discontent will be rife and not only won't they fight very well if attacked, they may even mutiny.

Essential items for sailing are the sextant, map, compass, telescope and weapons/cannon shot for when you are attacked. Sticking to the trade routes is safer but takes longer to complete journeys, so you may wish to chance your arm by crossing the seas. If you are committed to a life of piracy then the shipping lanes are the places to be.

One of the benefits of leading a life of crime is that if you manage to board and then overcome the crew of a ship you take control of the vessel and can then direct its actions. If you have enough crewmen left over from the battle, that is.

Primary victim

The primary victim on the memory saving altar appears to have been the sound effects, which are very ordinary. The standard of Pete Lyons graphics is somewhat uneven to boot. Some are quite average while other scenes are very nicely done indeed.

Tai-pan is evidently huge, and looking at some of the unwieldly elements in it, I wonder how the highly compressed Spectrum 128 version will play.

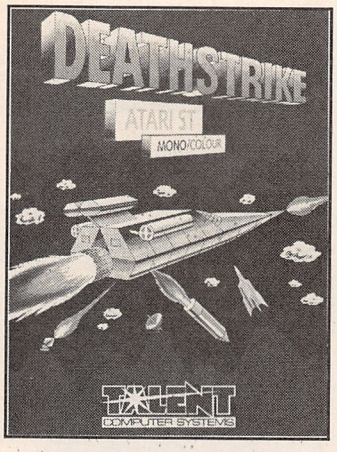
Despite the faults, which I feel could have been rectified if the game had been supplied on two discs, *Tai-Pan* on the ST is a well above average trading game which will interest all strategy fans.

Duncan Evans

Program *Tai-Pan* **Micro** Atari ST, Spectrum, C64, MSX, Amstrad CPC **Price** £7.95 Spectrum, £8.95 MSX, C64 (£12.95 disc), CPC (£14.95 disc), £19.95 ST **Supplier** Ocean, 6 Central Street, Manchester M2 5NS.

◀ continued from page 41

It had to happen, I suppose, a version of *Scramble* for the ST. What more can I say?



Commodore C16/Plus 4

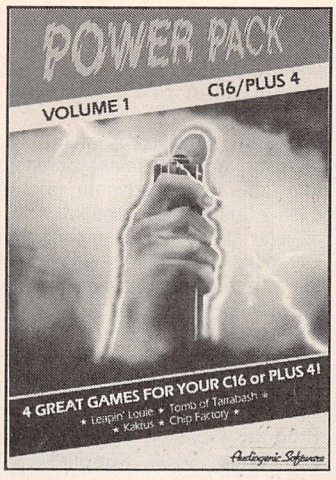
Program *Auto Zone* **Type** Arcade **Price** £1.99 **Supplier** Players, Mercury House, Calleva Park, Aldermaston, Berks RG7 4QW.

Moon Buggy style arcade game. It may not be the most original game in the world, but it's been quite well implemented and at £1.99 it's good value for C16/Plus 4 owners.

Program *Power Pack Volume 2* **Type** Compilation **Price** £7.95 **Supplier** Audiogenic Software, PO Box 88, Reading, Berkshire RG7 4AA.

Four simple arcade games on two tapes, namely, *Leapin' Louie* (platforms), *Tomb of Tarabash* (arcade adventure), *Kaktus* (indiscriminate blasting) and *The Chip Factory* (platforms and ladders).

Like the games on Audiogenic's Electron compilation, these all look a little bit dated, but then C16 owners aren't exactly spoilt for choice these days, are they?



Commodore 64

Program *Athena* **Type** Arcade **Price** £8.95 tape, £12.95 disc **Supplier** Imagine, 6 Central Street, Manchester M2 5NS.

See panel for comment.

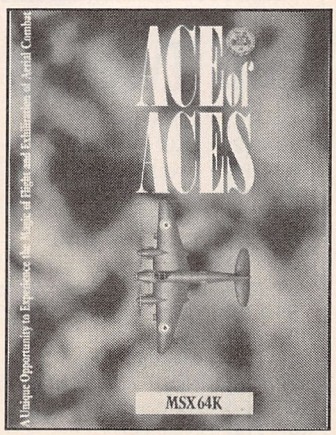
Commodore Amiga

Program *Hardball* **Type** Sports simulation **Price** £24.95 **Supplier** US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.

MSX

Program *Ace of Aces* **Type** Flight simulation **Price** £8.95 **Supplier** US Gold Units 2/3, Holford Way, Holford, Birmingham B6 7AX.

Good grief – a flight simulator for MSX machines. Actually, this is quite a good one too, and has the added virtue of an instruction manual that isn't as long as *War and Peace*.



Electron

Program *Power Pack Volume 2* **Type** Compilation **Price** £9.95 on cassette **Supplier** Audiogenic Soft-

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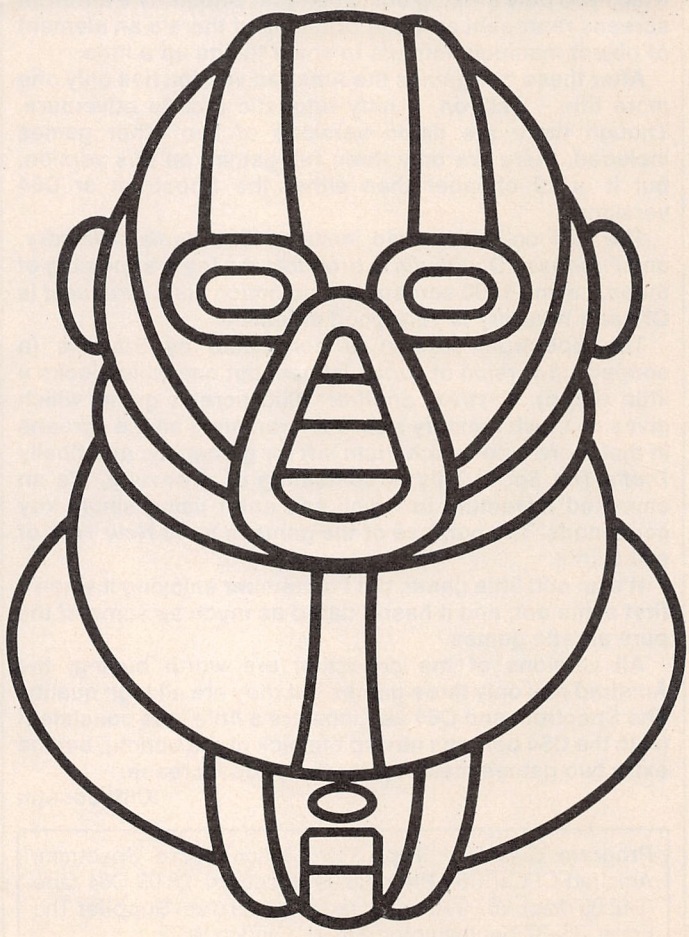

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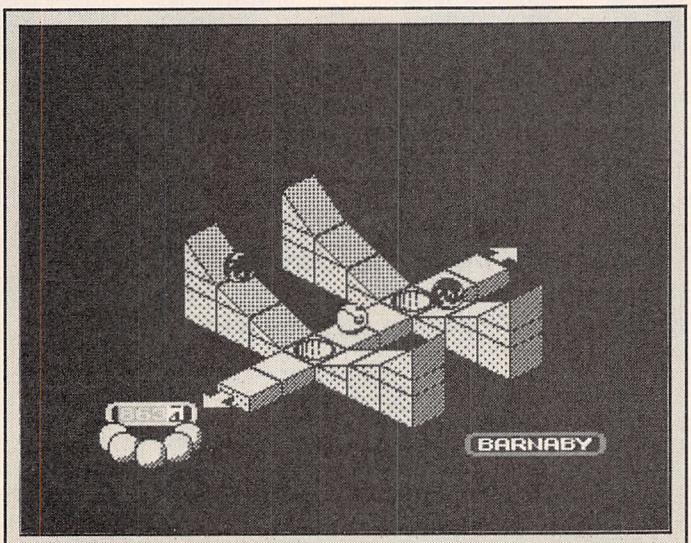


A great many of this summer's more interesting releases have been compilations, as the software companies keep their respective 'great game concepts' under wraps until the autumn; it's the post – *Exploding Fist* theory of the Summer Hit.

This particular example is The Edge's – a compilation for Spectrum, Commodore 64 and Amstrad with a different selection on each.

All versions of the collection include *Bobby Bearing* and *Brian Bloodaxe. Bobby* is perhaps the best of the various *Marble Madness* clones that have been going around (and the Spectrum version is particularly impressive), in which Bobby the bearing goes rolling around a complex 3D landscape in search of his kidnapped brother bearings.

***Brian Bloodaxe* is a sort of deranged platform game in which you play a viking out to conquer Britain. The different screens represent areas of Britain, and there's an element of object manipulation just to spice things up a little.**

After these two games the Amstrad version has only one more title – *Palitron,* a nifty futuristic arcade adventure. Though there are demo versions of two other games included, there are only three full games on this version, but it is £2 cheaper than either the Spectrum or C64 versions.

The C64 collection also includes *Quo Vadis, Wizardry,* and *Firequest. Quo Vadis* is probably the least appealing of these, having 1000 screens but not much else. *Firequest* is OK, and *Wizardry* is very good indeed.

The Spectrum version is completed by *Starbike* (a souped-up version of *Lunar Jetman,* but one which looks a little dated), *Psytrax,* another 1000 screen game which gives so much memory space to cramming all the screens in that there's not much room left for gameplay; and finally *That's The Spirit.* This is something of a novelty, it's an animated adventure in which you enter using single key commands. The purpose of the game is to rid New York of evil spirits.

It's an odd little game, but I remember enjoying it when it first came out, and it hasn't dated as much as some of the pure arcade games.

All versions of the collection are worth buying; the Amstrad has only three games but they are all high quality. The Spectrum and C64 versions are a little less consistent (with the C64 perhaps having the pick of the bunch), but the extra two games make up for the price increase.

Cliff Joseph

Program *Classix 1* **Type** Compilation **Micro** Spectrum, Amstrad CPCs, C64 **Price** £8.99 Spectrum, £8.99 C64 tape (£12.99 disc), £8.99 Amstrad tape (£14.99 disc) **Supplier** The Edge, 35–37 Southampton Street, London WC2.

◀ **continued from page 43**

ware, PO Box 88, Reading, Berkshire RG7 4AA.

A seven game compilation tape featuring an assortment of shoot 'em ups, arcade adventures, and even a fruit machine simulation.

None of the games are all that incredible, but there's enough of them on the tape to make it reasonable value.

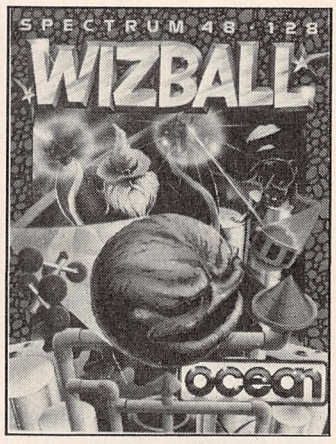
Spectrum

Program *Classix 1* **Type** Compilation **Price** £8.99 **Supplier** The Edge, 35–37 Southampton Street, London WC2.

See panel for comment.

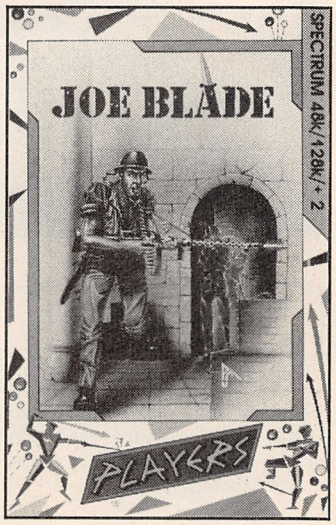
Program *Wizball* **Type** Arcade **Price** £7.95 **Supplier** Ocean, 6 Central Street, Manchester M2 5NS.

Spectrum version of a recent C64 game. The graphics do suffer quite a bit in comparison with the original, but the game itself is still enjoyable. You control the movements of a bouncing creature across an alien landscape, shooting the aliens and avoiding their traps as you head for a showdown with the evil Zark.



Program *Athena* **Type** Arcade **Price** £7.95 **Supplier** Imagine, 6 Central Street, Manchester M2 5NS.

See panel for comment.



Program *Joe Blade* **Type** Arcade **Price** £1.99 **Supplier** Players, Mercury House, Calleva Park, Aldermaston, Berks RG7 4QW.

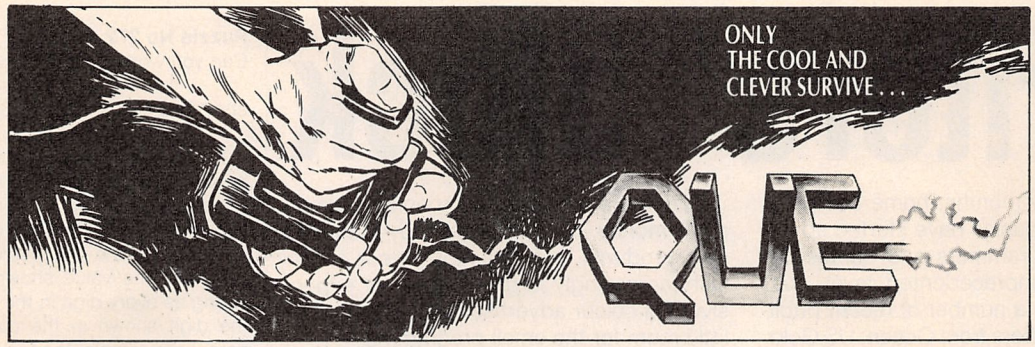
A modest little shoot 'em up game, but one with a nice feel to it. The graphics are a bit better than in the average budget game, in a cute, cartoony style, and there's an additional soundtrack for owners of 128 machines.

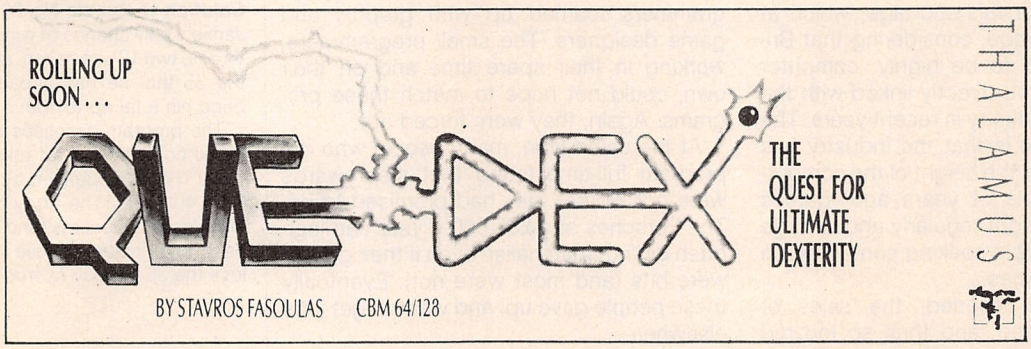
CHARTS

Top Twenty

1	(1)	Milk Race	**Mastertronic**
2	(2)	BMX Simulator	**Code Masters**
3	(4)	Road Runner	**US Gold**
4	(7)	Run for Gold	**Alternative**
5	(5)	Exolon	**Hewson**
6	(3)	Paperboy	**Elite**
7	(8)	Destructo	**Bulldog**
8	(11)	World Class Leaderboard	**Access/US Gold**
9	(9)	Cricket International	**Alternative**
10	(6)	Barbarian	**Palace**
11	(10)	The Last Ninja	**System 3**
12	(18)	Nick Faldo's Open Golf	**Bug Byte**
13	(–)	Kik Start 2	**Mastertronic**
14	(14)	Gauntlet	**US Gold**
15	(–)	Six Pak	**Hit Pak**
16	(–)	Head Over Heels	**Ocean**
17	(20)	Game Over	**Imagine**
18	(–)	Decathlon	**Firebird**
19	(13)	Living Daylights	**Domark**
20	(–)	Football Manager	**Firebird**

All figures compiled by Gallup/Computer Trade Weekly





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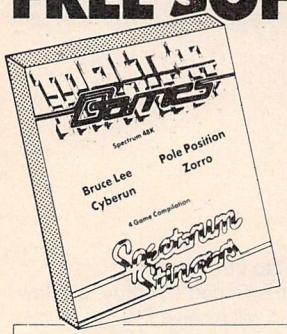

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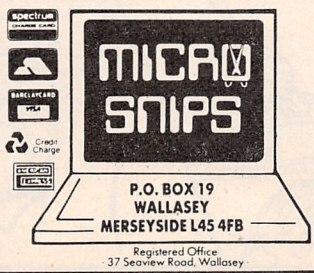

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COMING SOON

Writers' block

In the past few months, home computer software companies have started advertising for programmers and games designers on an unprecedented level. Just glancing through a number of recent publications reveals offers from Ocean, US Gold, Domark and Palace, to name but a few. The very fact that the adverts are there, surely gives a clear indication of the shortage of high quality programmers and graphic designers in the software industry.

The reasons for this shortage, which at first appears strange, considering that Britain is supposed to be highly 'computer literate' are, in fact, directly linked with the changes in the industry in recent years. The first major reason is that the industry has been shrinking. At the height of the computer boom a couple of years ago, games software was bought regularly and in large quantities by people seeking something to do on their machines.

As the boom receded, the sales of computers declined, and thus so too did the sales of games, as those people who only bought computers to be 'up' with the latest fad tucked their machines under the stairs to gather dust. This left only the 'hardcore' of computer users, many of whom used their machines more for 'serious' use than for playing games.

With fewer games being bought, further factors came into play. Firstly, competition between suppliers increased. In the early days, software was programmed by individuals who did everything themselves in their spare time, and then put a small black and white advert in a magazine to advertise their products, which were available only by mail order. Since computer owners had no other source of software, they had no choice but to buy such products, which were often awful.

Eventually the market grew to a level where businessmen rather than programmers became interested, and the larger software companies were formed.

With more professional organisation, and more money, behind them, they launched new products into the high street shops with increasingly large numbers of expensive, full colour advertisements. There was little room for the small programmer.

The other reason was the higher quality of the programs. Spurred on by the need to produce more sophisticated programs to catch the purchasers' money, the quality of software increased in vast leaps as programmers teamed up with graphic and game designers. The small programmers, working in their spare time and on their own, could not hope to match these programs. Again, they were forced out.

At the same time, many people who did program full-time found that the rewards were not all that they had promised to be. The Porsches and £35,000 a year earnings often did not materialise even if their games were hits (and most were not). Eventually these people gave up, and went to get jobs elsewhere.

And thus today, there are not enough good programmers or designers to go around, especially programmers with the necessary skills for the new 32-bit machines. Even many of the early 'hackers' are no longer interested in computers, and the teen age 'whizz kids' have abandoned their machines to concentrate on exams and employment.

The users of the main 'boom' of 1983/84 often cannot program, their interest in computers never having gone beyond playing games. The adverts for programmers still mention money to be made ("How rich do you want to be?" runs the Ocean ad), but the gloss has worn off and much of the talent has departed, leaving the generally stagnated computer games industry that we all know today. Many of the people who provided originality and skill find that it's simply no longer worth it.

Robert Halliday

Puzzle No 272

Can you work out the following multiplication?

abc * bca * cab = 186599374

As can be seen, each of the three-digit numbers to be multiplied consists of the same three digits, though differently arranged. The final product is a nine-digit number, but unfortunately it is *not* the one given above!

In fact, the value shown could not be more wrong as every digit in the correct answer is *not* the digit shown in the corresponding position here. For example, the first digit of the answer is not a one, the second digit is not an eight, and so on.

All we need to know is the correct nine-digit product. Can you find it?

Solution to Puzzle No 267

Jamie's only chance of winning is if he scores two threes, two 12's, a seven, and a 28. Together with the 35 that he has already scored, this would bring his total up to 100.

The program assesses the scores obtainable for all combinations of rolls of the remaining six balls. These are defined by the six loops A to F at lines 40 to 90. The array S() is loaded with the eight possible scores, and this is used to assess each total in turn. Those which sum to 65 (100 less the 35 already scored) are printed out.

```
>
  10 DIM S(8)
  20 RESTORE
  30 FOR Z=1 TO 8:READ S(Z):NEXT
  40 FOR A=1 TO 8
  50 FOR B=A TO 8
  60 FOR C=B TO 8
  70 FOR D=C TO 8
  80 FOR E=D TO 8
  90 FOR F=E TO 8
 100 T=S(A)+S(B)+S(C)+S(D)+S(E)+S(F)
 110 IF T=65 THEN PRINT S(A),S(B),S(C)
,S(D),S(E),S(F)
 120 NEXT:NEXT:NEXT:NEXT:NEXT:NEXT
1000 DATA 3,7,12,26,28,35,45,51
```

Winner of Puzzle No 267

This week's winner is Robert Doughty, of Stowmarket, Suffolk, who will receive £10.

Rules

The closing date for Puzzle 272 is September 16.

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